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ABSTRACT

A methodology was developed for the systematic analysis of the nursing profession, as part of the Kentucky Nursing Education Project's Nursing Delineation Study. The methodology defined and ranked nursing tasks according to the degree of complexity in order to promote articulation in nursing practice and education and to better utilize the different categories of nursing personnel. A 17-member task force represented the major domains of nursing (administration, clinical, education, and research). The methodology was based on Gilpatrick's "Health Services Mobility Study (HSMS) Method of Task Analysis and Curriculum Design" (1977). The following five steps were undertaken: (1) listing of nursing tasks; (2) defining tasks; (3) scaling each task by type, level of skill, and knowledge required; (4) task list review/revision by external consultants; and (5) additional task rankings and grouping of tasks, weighting of skill or knowledge area, and developing job descriptions and educational objectives corresponding to task data for each level of practice. Appendices include: skill and knowledge scales with descriptors, knowledge classification system, standard forms, and a glossary of terms used in task descriptions. Project staff and areas of expertise are also identified. (SW)

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KENTUCKY KNEP NURSING EDUCATION PROJECT

NURSING DELINEATION STUDY

VOLUME 1: METHODS REPORT

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COUNCIL ON HIGHER EDUCATION
FRANKFORT, KENTUCKY
AUGUST 1982

KENTUCKY NURSING EDUCATION PROJECT

NURSING DELINEATION PILOT STUDY

1981 - 1982

Volume I
Methods Report

This study was made possible through a grant
from the W. K. Kellogg Foundation.

Council on Higher Education
Frankfort, Kentucky

Harry M. Snyder
Executive Director

August, 1982

"If I am not for myself,
who will be?

If I am for myself alone,
what am I?

And if not now, when?"

Hillel

We did it because it was the time to do it.

It was the "when."

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Kentucky Nursing Education Project
Council on Higher Education

1981-82
Nursing Delineation Pilot Study

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PREFACE

A task force of seventeen professionals representing major domains of nursing (administration, education, practice, and research) set forth to define what the profession of nursing is all about and, in the process, determine valid levels of practitioners required to maintain its relevancy to changing health care. The implications for curriculum and job staffing patterns became obvious.

Such an involved delineation of the nursing profession at times seemed it would be an insurmountable accomplishment. Where in fact does nursing begin and end? And what are the degrees of complexity in between? The methodology (Volume 1) used by the Kentucky Nursing Delineation Study Task Force followed an intricate series of guidelines and standards which define a task as a unit of work with a distinct beginning and an identifiable output upon its termination. Tasks describe the often times simultaneous, split-second mental and/or physical manipulation of data, materials and machines and human judgements. With careful application, a task may describe all the processes, procedures, and contingencies where it could or should be performed. The attitudinal aspects of any profession are difficult to define in understandable terms. However, the broad scope of how task is applied in this methodology provides an avenue whereby the affective domain can receive significant attention. The interface between tasks is developed when the output or product of one task is used or required to perform additional tasks. The varying degrees of skill and knowledge necessary to accomplish each task become the basis for determining levels of practice and corresponding education requirements.

Upon reflection of its year's effort, the task force has achieved a milestone in cooperative sharing of ideas to describe the nursing profession in a manner that is pertinent to practice and educational settings. The recognition that the results (Volume 2) are only representative is at once frustrating and truly rewarding. A methodology has been found to direct personal and professional biases of nurse administrators, educators, practitioners and researchers into objective analysis of their profession. However, the task force is the first to recommend that the study be continued and replicated if the true impact of the results is to be felt, acknowledged and acted upon.

ACKNOWLEDGEMENTS

Through the philosophical and financial support of the W. K. Kellogg Foundation and the Kentucky Council on Higher Education, Mr. Harry M. Snyder, Executive Director, the Nursing Delineation Study has become a reality.

The members of the Subcommittee on Nursing Education under the direction of Dr. Irene Hudleson, Associate Director for Nursing (Council on Higher Education) were the first to set forth the notion of conducting the study and established a plan for its implementation. Their continuous guidance provided support throughout the study.

The pilot study could not have been conducted without the support of the participants' employers. Each facility provided leave time for monthly meetings and encouraged the involvement of their staff. Without this level of commitment and recognition of the importance of the study, accomplishing such a formidable task would not have been possible.

Several other people were instrumental in the development of this study. Dr. Eleaner Gilpatrick (Hunter College, New York) whose task analysis concepts and procedures are the guts of the methodology described herein, is extended sincere gratitude for the many years she dedicated to developing the Health Service Mobility Study (HSMS). Dr. Gary Breegle (Kentucky Council on Higher Education) provided analytical expertise and unending guidance and encouragement to understand and adapt HSMS to today's world of computers. Ms. Angela Mahoney devoted substantial time and talent to program these computer adaptations and met the always present deadlines of the study. There were many support staff from the Council on Higher Education, especially Ms. Teresa Kinne, Ms. Ruth Taulbee and Ms. Sandy Waits, who spent seemingly endless hours typing and revising the work of the Nursing Delineation Study Task Force. To all these people, thank you.

SPECIAL NOTE TO THE READER

It is imperative that the reader understand several pertinent points about the Kentucky Delineation Pilot Study, primarily concerning the degree to which the participants of the study felt they were able to maintain their high standards and still produce even preliminary results.

Implementation of the methodology described in this report allowed a logical, systematic analysis of the nursing profession for the purpose of statewide planning. After working with the methodology for one year, the study task force remained confident the basic premises of the method are valid. Additionally, the members believed the interpretation of nursing in terms of definable "tasks" was not limited to a traditionally technical slant but is also able to address the affective aspects of nursing.

The most significant limitation of the study continues to be the alloted timetable. The massive preliminary data generated by the pilot study are seen as only representative but also as an excellent base from which to continue refining, evaluating and producing more comprehensive results.

As the reader reviews the delineation procedures, it should be noted that once the nursing tasks were defined and ranked according to degree of complexity, minimal time was available to conduct the final analyses and interpret the results of the final task clusters, levels of practice and corresponding educational objectives. This is discussed further in Volume 2: Results.

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1 INTRODUCTION

The Nursing Delineation Pilot Study (1981-82) was conducted as a cooperative effort by a voluntary task force of nurse administrators, educators, practitioners and researchers. The study represents one segment of a nursing project to develop a coordinated statewide system of nursing education in Kentucky. The Kentucky Nursing Education Project (1977-82) was administered under the auspices of the Council on Higher Education and funded jointly by the Council and a W. K. Kellogg Foundation grant made available through the Southern Regional Education Board Nursing Curriculum Project.

It is believed that a valid description of nursing should be an integral component of statewide planning. The implications for manpower requirements, bi-level licensure and corresponding educational programs consistently demand evidence to substantiate existing trends or to defend recommendations for change. The methodology described in this report offers a sophisticated, highly objective solution to the need for a concensus about articulation in nursing practice and education.

In planning to meet statewide health manpower needs, state coordinating agencies are often faced with a plethora of related programs which either stand alone in terms of their perceived terminal degree status, or, are vaguely articulated. The descriptions of terminal competencies of the graduates of related programs confuse employers to the extent that the graduates are frequently employed on an interchangeable basis. Professional politics deter or blatantly resist changes in educational programs that would permit articulation between programs.

Nursing programs provide a classic example of multi-level educational programs that provide similar or identical skills and knowledge to individuals who are then eligible for the same licensure examination; yet, ostensibly the graduates are proported to have different competencies. The problem then becomes the need to explicitly identify the skills and knowledge required to carry out nursing tasks and to determine the skills and knowledge reflected in the curricula of the various levels of nursing programs. The delineation study provided a unique opportunity to examine these issues.

> The attributions associated with professionalism are the products of a successful campaign to convince the audience that the occupation is providing a professional service that no one else can provide nearly as well. For example, a characteristic often attributed to a "true" profession is the possession of a unique and expanding body of knowledge. The tactics involved in achieving the attributed characteristic require that reports be issued to interested bystanders proclaiming the findings of research being conducted by members of the occupation. (DeSantis, 1982.)

Resolution of the critical issues in the practice of nursing which can be addressed through nursing education or within the practice setting depends on a cooperative, objective effort to develop a common definition of the nursing role that is accepted by employers, practitioners, and educators.

Initiation of this delineation study received impetus from a significant issue and subsequent recommendations identified in Part Five: Nursing. Kentucky and Health Sciences Education. Comprehensive Planning for Higher Education, A Phase One Report (1975).

ISSUE:

THERE IS NO BROADLY ACCEPTED DEFINITION OF THE LEVEL OF EDUCATION OR PRACTICE ROLE FOR THE GRADUATES OF THE VARIOUS TYPES OF NURSING PROGRAMS.

RECOMMENDATIONS:

1. The Council on Public Higher Education, through its Nursing Education Advisory Committee, should provide a forum for nursing education and nursing service to work cooperatively to explore, define, and plan for the education and utilization of the different categories of nursing personnel essential to the delivery of quality nursing care in an expanding health system.

2. The Council on Public Higher Education, through its Nursing Education Advisory Committee, should support in-depth research activities to determine what nursing functions are essential to provide quality nursing care based on the needs of the patient and determine what categories of nursing personnel are needed to provide this care.

3. The Nursing Education Advisory Committee should determine appropriate educational programs to prepare the various categories and number of nursing personnel identified by the study.

4. The Council on Public Higher Education should communicate its future recommendations on the utilization of levels of nursing personnel to institutional accrediting and licensing agencies. The Committee should encourage these agencies to assure the proper utilization of nursing personnel by including utilization criteria in the institutional accrediting or licensing process.

Consequently, the Kentucky Nursing Delineation Pilot Study (1981-82) was conducted to "provide a forum for nursing education and nursing service to work cooperatively to explore, define, and plan for the education and utilization of the different categories of nursing personnel essential to the delivery of quality nursing care in an expanding health system."

Task Force

Once the need and feasibility for the study was determined, project staff formed a statewide panel of experts. The task force represented what was believed to be the major domains of nursing: administration, clinical, education, and research. For the purpose of assignments, the seventeen members comprised four separate working groups to correspond to the domains of "tasks." The actual representation is summarized in Table 1.0.

Table 1.0
Nursing Delineation Pilot Study Task Force Representation

Type of Facility	Domain				
	Admin.	Clin.	Educ.	Res.	Total
University		2	3	(1)	5
Health Care Facility	1	6	2		9
Health Department	1		1		2
Board of Nursing			1	(1)	1
Total	2	8	7	(2)*	17

*These two individuals also served on the Education Group.

The panel was selected from approximately forty nominations after careful review of their curriculum vitaes. The original nominations were sought by formally requesting members of the Subcommittee on

Nursing Education and nursing service administrators from across the state to submit names of potential participants. This inquiry placed emphasis on the mandatory time commitment for active participation, the need for broad qualifications of members and the necessarily limited size of the task force. The two major goals in selecting the participants were to, first, evenly divide the group to represent practice and education and, second, to include those with the most diversified areas of expertise and therefore, minimize the size of the membership. It was believed a manageable number of participants would help in conducting the study through group process. A more detailed breakdown of the expertise represented in the entire group is presented in Appendix A.

Timetable

Twelve monthly meetings (approximately six hours each) were scheduled from September, 1981 to August 1982. The first six meetings involved presenting each step of the methodology as well as time for each of the four groups to work separately. Task force members were aware from the beginning of the study they would be spending additional time in between each meeting working independently on their assignments. An average of 13.25 hours per month were spent on independent work. This time commitment was critical in the selection of task force members. The original timetable compared to the actual occurrence of events is found in Appendix B.

Resources

A review of the literature was conducted prior to the first meeting. It included a search for references about existing task listings and

descriptions related to nursing which, when applied to the study definition of a "task," would assist implementing the methodology. However, the combined expertise of the task force was the most essential resource of pertinent data necessary to conduct the study.

4 METHODOLOGY

The chosen method to delineate the profession of nursing was based on Gilpatrick's Health Services Mobility Study (HSMS) Method of Task Analysis and Curriculum Design (1977). This is a sophisticated process whereby objectivity is maximized to produce usable data for curriculum development and manpower planning. Gilpatrick's original procedures were at times cumbersome due to lack of computerized analysis. Therefore, adaptations were designed to maintain the integrity of the sophisticated logic of HSMS and feasibly accomplish a delineation of the nursing profession. Five distinct steps comprise the Nursing Delineation Study use of the HSMS (See Figure 1.0):

1.) A master list is identified of all nursing "tasks."

2.) Each task is systematically described according to a strict definition of the term "task."

3.) A. Each task description is scaled for the type and level of skill required for its successful performance and annotated regarding which part(s) of the task requires it.

B. Each task description is also scaled for the type and level of knowledge required for its successful performance and annotated regarding which part(s) of the task requires it.

4.) The task list, descriptions and skill/knowledge scalings are reviewed for accuracy and comprehensiveness by external consultants; revisions and corrections are made as appropriate.

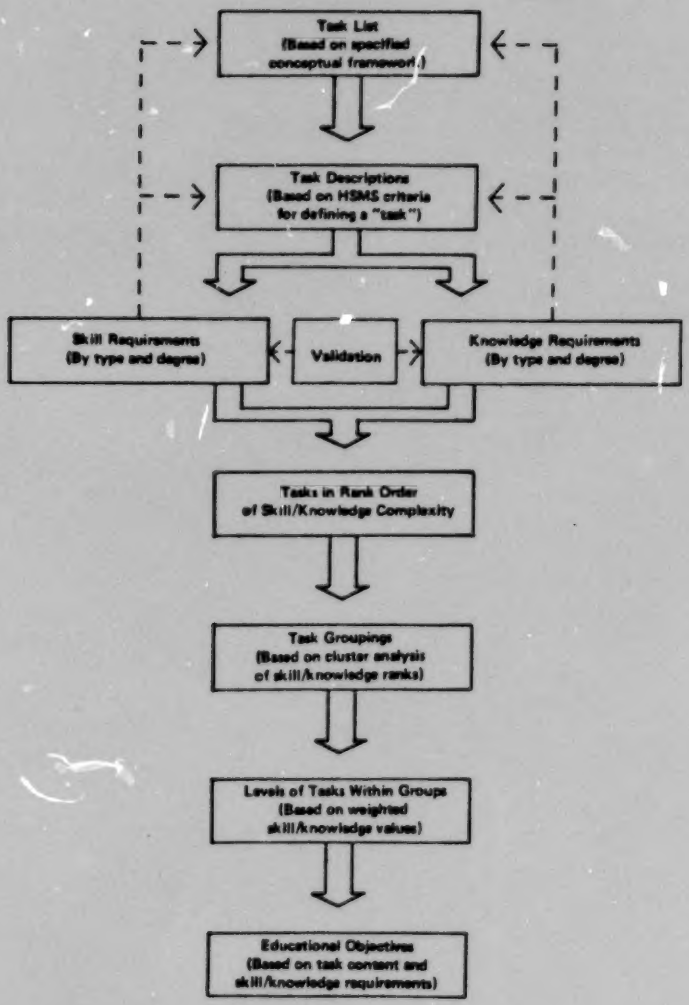

Figure 1.0. Overview of Nursing Delineation Pilot Study using HSMS.

5.) The data are finally analyzed through a series of procedures briefly described here:

A.) scaling values, and therefore, tasks are ranked within and among the tasks;
B.) based on the rankings, cluster analysis is performed to identify groups of tasks;
C.) levels of practice within each group are distinguished by weighting the scale values for each skill or knowledge area used in a given group (or cluster) of tasks.
D.) job descriptions and corresponding educational objectives are compiled from the task data for each level of practice.

Step 1 - Task Identification. This involved developing a comprehensive master list of all nursing activities, regardless of any current delineation and not limited to entry level practices. The master list was developed specifically according to the following explanation found in the HSMS methodology:

> In the HSMS method, a task is defined so that it can identify a unit of work which can be moved from one job to another without disrupting other work activities. The task is conceptually smaller than a job as whole, and generally smaller than the work needed to produce an entire product, such as a health service or a manufactured item. The task is part of a series of work activities which are steps leading to or assisting in the production of final products. The task is defined in terms of a performer's outputs rather than an institution's products; the latter are the units that are sold. The HSMS definition of a task is as follows:
>
> > A task is a series of work activities (elements) which are needed to produce an identifiable output that can be independently consumed or used, or that can be used as an input in a further space of production by an individual who may or may not be the performer of the task.
> >
> > In principle, someone other than the performer of the task must potentially be able to use or consume the output of the task.
>
> Consumption of an output means that it is used up, sometimes at the point of production. For example, served food, an administered injection, or counseling are all examples of outputs which are consumed rather than further acted upon. An output is used as in input in a further stage of production if it is a changed condition or something which will be further acted on by other performer(s) in a series of activities that result in a final product (Gilpatrick, 1977).

The tasks were identified by conducting a literature search and having qualified practitioners (analysts) interpret and use these materials to implement the HSMS definition of task. (A complete bibliographic listing of the literature is presented in Volume 2: Results.) Two steps were taken to validate the comprehensiveness of the master task list. First, the types of tasks which encompass the various roles and spectra of all nursing practices were categorized as follows:

(1) Administration
(2) Clinical
(3) Education
(4) Research

It was essential for the analysts to maintain objectivity throughout this process (and the entire study) and identify tasks from a universal viewpoint. The tasks were not identified according to particular types of settings nor according to a particular level of person believed to be currently performing the task. Secondly, every effort was made to have the tasks developed by dyads of analysts to provide a check and balance system within each category.

Step 2 - Task Description: Each task in the master task list was then described in a way that reflected the type and amount of skill and knowledge required to satisfactorily perform it.

> The component steps of a task are its elements. They include the steps needed to initiate the task, carry it out, and terminate it. The elements are the individual small units of work, whether physical and/or mental, which produce the output. Elements do not have identifiable outputs which can be consumed or used independently, or which can serve as inputs in a further stage of production by anyone other than the person carrying them out.

> An element has an output usable only by its performer. This concept is especially useful in distinguishing between a task and an element. When a surgeon scrubs before surgery, the washed hands are an output not usable by anyone expect the washer of the hands, the surgeon. Washing hands is therefore an element. Reading a thermometer is an element in a task whose output is a recorded temperature. Only the person reading the thermometer has the information to transmit or record the reading. In contrast, a prepared surgical tray is the output of a task, since the person preparing the tray need not be the one to use the tray. The HSMS definition of task is an abstract concept. It's intended to cover the task whenever it is done. The definition includes all the contingencies or options that may ever be carried out by the performer to produce the output of the task (Gilpatrick, 1977).

Step 3 - Scaling Tasks for A.) Skill and B.) Knowledge. These two steps were similar enough in methodology to be explained here together. Each completed task description was reviewed and specifically evaluated for sixteen different skills. The HSMS skills each task was evaluated for were categorized as follows:

(1) Manual Skills (i.e., locomotion, object manipulation and guiding and steering),

(2) Interpersonal Skills (i.e., human interaction and leadership),

(3) Language Skills (i.e., oral, reading and written use),

(4) Decision Making Skills (i.e., methodological and qualitative),

(5) Intellectual Skills (i.e., figural, symbolic, taxonomic and implicative), and

(6) Responsibility Skills (i.e., financial and human).

This analysis was accomplished by using predefined numerical scale values for the different levels of each skill necessary to successfully perform the task. (See Appendix C.) For example, Figure 2.0 shows the skill scale for Human Interaction.

HUMAN INTERACTION SKILL SCALE

This skill refers to the degree of sensitivity to others required of the performer in the task being scaled. The skill involves the performer's perception of the relevant characteristics or state of being of the other person(s), the performer's attention to feedback as the interaction occurs, and the performer's appropriate modification of his behavior so as to accomplish the task. The skill is involved if the task requires any personal contact or interaction with others.

The level of the skill rises as the degree of perceptiveness and sensitivity required of the performer rises, and as the subtlety of the feedback to which he or she must respond increases. The scale level is not determined by the level of knowledge required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to be in contact with or to interact with other people.
1.0	The task requires the performer to be in only general contact with other people. Very little sensitivity to or perception of the other person(s)' relevant general characteristics or state of being is required, and little awareness of very obvious feed-back is required for the performer to adjust his behavior to perform the task.
3.0	The task requires the performer to interact with others in the performance of the task. The performer is required to be somewhat sensitive to or perceptive of the other person(s)' relevant general characteristics or state of being, and to be aware of very obvious feedback so as to adjust his behavior accordingly.
5.0	The task requires the performer to interact with others in the performance of the task. The performer is required to be quite sensitive to or perceptive of the other person(s)' relevant characteristics or state of being, and to be aware of fairly obvious feedback so as to adjust his behavior accordingly.
7.0	The task requires the performer to interact with others in the performance of the task. The performer is required to be keenly sensitive to or perceptive of the other person(s)' relevant characteristics or state of being, and to be aware of fairly subtle or complex feedback so as to adjust his behavior accordingly.
9.0	The task requires the performer to interact with others in the performance of the task. The performer is required to be keenly sensitive to or perceptive of the other person(s)' relevant characteristics or state of being, and to be aware of very subtle or very complex feedback so as to adjust his behavior accordingly.

Figure 2.0. Definition and scale value descriptions for the Human Interaction skill scale of the HSMS Method of Task Analysis and Curriculum Design (Gilpatrick, 1977).

The task descriptions were reviewed again in a similar manner, only this time they were evaluated for the knowledge required to perform the tasks. The HSMS taxonomy of hundreds of knowledge categories (Appendix E) was utilized to accomplish the step. The categories in the Knowledge Classification System (KCS) covered a broad range of topics and was expanded to meet the needs of the study. The KCS covered areas such as: chemistry, physics, biology, nursing, education, interpersonal relations, administration, psychology, sociology, law, economics, math, and writing. Concurrently, when the necessary knowledge categories were specified per task, the level of knowledge was also identified according to the scale system presented in Appendix D.

Step 4 - Validation. The task force and project staff recognized the limitations of any study involving personal and professional judgements. Group process and decision making were functions of validation used throughout the study procedures. Group concensus at each step of the methodology was considered an important component of validation. Therefore, the selected overall composition of task force membership for a full study has direct impact on the acceptability of final results.

In order to maximize the objectivity of the final results, external consultants were also used to evaluate the data base (i.e., the task list, descriptions, skill/knowledge scalings) before the statistical analyses were conducted. Sequencing the validation at this point in the study rather than at the end was important in maintaining the usefulness

of the task data to meet its intended purpose "to explore (and) define...the different categories of nursing personnel essential to the delivery of quality nursing care in an expanding health system." (CHE, 1975.)

Turning again to the four categories (administration, clinical, education, and research), consultants whose cumulative expertise addressed all the areas were employed to formally review the data base. In critiquing the task list and descriptions, it was necessary for them to maintain objectivity and review the content from a universal viewpoint. Each of the five national nursing consultants were charged with the following responsibilities:

1.0 Review the task list of all the nursing activities identified by the Kentucky Nursing Delineation Study Task Force.

- 1.1 Critique task list for comprehensiveness.
- 1.2 Critique task list for accuracy.
- 1.3 Critique task list for relevancy to current and future trends in nursing/health care.

2.0 Review specific task descriptions related to her area(s) of expertise: practice; administration; research; and education.

- 2.1 Critique task descriptions for comprehensiveness.
- 2.2 Critique task descriptions for universal accuracy.
- 2.3 Critique task descriptions for relevancy to current and future trends in nursing/health care.

3.0 Review the skills and knowledge areas identified as necessary for successful performance of ten percent of the tasks related to her area(s) of expertise.

- 3.1 Critique the skill/knowledge identifications for appropriateness of type and level.

Step 5 - Analysis. There were several sequential analyses performed on the raw task data resulting in various types of matrices and finally in job descriptions and educational objectives by level of practice. While analysts were not directly involved in carrying out the statistical analyses, each had to have an understanding of the analytical concepts in order to make some required judgements along the way.

In preparation for analyses of the task descriptions, all the scale values were coded for computerization. These data formed the basis for all subsequent statistical analyses.

Synopsis of Analytical Procedures

1) Raw Task Data

The sequence of analyses began by developing a data matrix of the highest scale value recorded for any skill or knowledge category used in each task. Therefore, if a skill/knowledge category was scaled at a variety of levels within the same task, only the highest scale value for that task would appear in the matrix.

2) Ranked Task Data

Each scale value in the matrix described above was ranked in two different ways:

a. each scale value for each task was ranked among all the other tasks using the same skill or knowledge, and

b. each scale value for each task was ranked among every other scale value assigned to the same task.

Subsequently, the two rank scores were summed to give a total rank score for each scale value in the matrix. These totals were themselves added together providing a summative rank score for each task.

3) Ranked Sequence of Task Data

The summative scores were numerically sequenced from lowest to highest, rearranging the original matrix. The assumption began here that the tasks were in order of ascending degrees of required expertise. The list of task numbers, names and task descriptions were also reordered to follow this new sequence.

The sequence of tasks was reviewed at this time to identify obviously misplaced tasks which may indicate a need for analysts to review/revise task scale values. As necessary, revisions were submitted for computer coding and the process repeated to this point.

4) Cluster Analysis - Task Groups

The summative rank scores in lowest to highest sequence underwent cluster analysis to empirically measure the similarities or distances among tasks and classify them into optimally homogeneous groups (Johnson, 1976). What resulted were potential job clusters with their component tasks still ordered in lowest to highest range of expertise.

5) Histogram

The numerical sequence of summative rank scores was displayed in a histogram to assist interpreting the cluster analysis results.

Also, the task names and descriptions were used here. Neither the histogram nor the list of task names/descriptions alone was the deciding factor in the final interpretation of cluster analysis.

6) Leveling Matrix

Once the number of clusters was determined, each group of tasks was looked at separately. The first cluster, for example, was considered to be a job cluster representing a particular type of practice. A new matrix was developed for each job cluster from the tasks still grouped in lowest to highest sequence. However, the skill/knowledge axis displayed a particular order based on the categories recorded for the first task in the cluster and, therefore, were listed first on the skill/knowledge axis. Then the categories recorded for the second task that were also used in the preceding task were identified. Any new categories not previously used were displayed next on the skill/knowledge axis. This procedure was followed for every task in the cluster. What actually resulted was a matrix providing a step-like ladder progression and the basis for determining levels of practice within each cluster. (See Table 2.0.)

7) Leveling Process

The new type of matrix described above easily allowed determination of a series of significant increases in types of skill and knowledge requirements. Each scale value entered for a given category in the cluster was weighted in relation to how it was used in the other tasks in the cluster. The total weighted score for each task helped to determine where there were the greatest

differences between tasks and consequently indicating potential levels of practice within the group of tasks. Here, as in the cluster analysis, the task content was considered in the final determination of practice levels. Each cluster was subject to the same leveling process.

Table 2.0

Model Format of Job Structure Data Matrix

Skill or Knowledge Categories	Task Number							
	279	280	288	158	284	161	156	11
Human Interaction	X*			X		X	X	X
Leadership	X	X	X					
Taxonomic	X		X	X				X
Implicative	X	X			X		X	X
Financial Error		X	X					
61120000**			X				X	
65620000		Level 1	X					
11743000			X	X	X	X		
43600000				X	X		X	
61110000				X				
52200000					X			X
11743100						X	X	
42100000					Level 2	X	X	
65260000						X	X	X
13770000							X	X
11745100								X
13130000								X
						Level 3		

* Represents scale values.

** Each category from the Knowledge Classification System is identified by an eight-digit code number. (See Apendix E.)

Note: Solid lines indicate the final category for a given task; dotted lines parallel new categories required for a given task compared to previous task(s), thus providing the ladder configuration.

8) Compilation of Objectives by Level of Practice

Based on the final sequence and levels of tasks, educational objectives were developed directly from the task descriptions. Essentially each objective defined the specific application of the skills and knowledge areas in each level of practice. Consequently each objective was identified by a code indicating the cluster and level of practice it was found in.

9) Interpretation Matrix

Finally, interpreting the wealth of data was assisted by developing one more matrix that provided a more concise and manageable view of the final results. It showed the median level of each skill and knowledge area calculated for each level of practice, thereby comparing the differences between each level and between the groups of tasks or job structures.

The purpose of this array was also to test the assumption that the rank order of tasks reflected an increasing trend in scale values. Further, it allowed a clearer assessment of, for example, the greater necessity for overall psychomotor skills in lower level tasks versus a greater breadth of knowledge in more complex tasks.

5 CRITIQUE OF THE METHODOLOGY

After the Delineation Study had been underway for eleven months a meeting of the task force was held specifically to assess the methodology and identify its strengths and limitations. The results of this critique may be categorized into the following areas: 1) approach to nursing, 2) task force representation, 3) logistics/orientation, 4) process, and 5) application of "task."

Approach to Nursing

Strengths	Limitations
The study provided the opportunity to look at various facets of nursing, i.e., administration, education, practice and research.	Defining nursing in terms of tasks may be misleading to anyone not involved in the Study. "Tasks" as the focus of the study implies technology, despite the fact that to care, to nurture and to carry out other emotional dimensions inherent in nursing are also tasks.
An objective approach was able to be used to define what is included in the complex profession of nursing and to identify what skill and knowledge are needed for the various aspects.	
Cognitive, technical and affective activities in nursing may be addressed using the study criteria for identifying and describing tasks and recognizing the skill and knowledge requirements.	The data generated were based on one geographic region; the universality of the approach to nursing is uncertain at this point.

Although the term "task" often portrays a technical emphasis, its application in this study was very broad in nature.

The overall study recognized the need to identify the nursing needs within the state.

The findings from the volume of data able to be generated by this format have major implications for nursing.

It seemed disturbing to consider skill and knowledge needed to perform tasks competently and not to consider optional knowledge which is desirable but not necessary. It seemed minimal nursing care was described and not the best nursing has to offer.

Task Force Representation

Strengths

The diversity of members from various backgrounds provided a wide variety of expertise, experience and representation from administration, education, practice and research. This is often not the case in nursing research.

The majority (80%) of the members who started the study were active throughout the process and were willing to devote personal time to the study.

The group was able to work together for a common goal.

Limitations

The overall make-up of the task force was representative. All group members come with the biases of their education and experiences and are sure to affect almost all areas of the study.

With the large magnitude of the study, even a 20% attrition rate affected the enthusiasm of those who remained.

Representation from other areas in practice and educational settings would be needed to refine the preliminary results.

A project of this magnitude requires a broader base and input from those members of the profession actually involved in "hands-on care" of clients (both patients and students).

Logistics/Orientation to Study

Strengths

A formal request was made to employers for participants to become actively involved in monthly meetings and additional activities.

Direction and organization of the study was the responsibility of an individual who had previously used and was knowledgeable about the methodology.

Working in small groups expedited the task analysis process.

Specific time was allocated for monthly meetings.

Limitations

The small groups did not always meet together. This physical separation may show up in a varied use of the method.

There was no concentrated period at the beginning of the study devoted to presenting a more detailed overview of the methodology (including final data analysis.) More frequent meetings were not planned throughout the study to meet original timetable deadlines.

The scope of the methodology was not realized until its implementation was well underway. Therefore, an excessive amount of time was spent writing and rewriting task descriptions.

A year was not enough time to complete the study without releasing participants from regular duties.

It was necessary to reorient oneself each time the study was worked on. This took a great deal of time and made it very difficult to work independently.

Process

Strengths

The step-by-step process provided an objective look at a complex discipline that presently is not well defined.

The availability of the method provided direction and focus for the group.

The method encouraged group members to validate one another's work.

Establishing deadline dates for various steps of the method helped to accomplish even the preliminary results.

Individuals followed through on the entire method for their assigned group of tasks.

Sharing ideas from a group approach allowed for individual stimulation.

The method allowed for the use of a framework (of nursing) to be designed to recognize the definite volume of work necessary for each individual.

Computer analysis allows multiple methods of examining task data.

The method design was excellent for looking at skill and knowledge requirements by degree.

Final results will produce curriculum designs and job descriptions at various levels.

The method kept a group of nurses with widely varied backgrounds focused on the study and demanded analysis of activities being described and assignment of a value or weight to it.

Limitations

There was not enough time to thoroughly search the literature for tasks and descriptions.

Tasks are defined with varying degrees of specificity.

Standard definitions of terms were not fully developed nor utilized.

The Knowledge Classification System needed additional categories added to it to make it more representative (e.g., of humanities, nursing, caring.)

The skill and knowledge scales were not critiqued by the group before using them.

The knowledge and skill scales were well defined but allowed a great deal of subjectivity. However, adjustments for more objectivity may be difficult.

Application of "Task"

Strengths

Tasks were generally not described as procedures.

A representative sample of tasks in nursing was generated.

Technical as well as other types of activities could be defined by applying the guidelines for writing tasks.

The use of the term "as appropriate" could be used to indicate where a judgement was necessary to carry out the task elements.

The amount of detail in the task descriptions was dependent on the ability of the description to convey the use of the skill and knowledge necessary to perform the task in any given setting.

Limitations

It was necessary to broaden the scope of the task descriptions due to the large volume of tasks, especially if the definition of "task" was to be strictly followed.

Not all tasks were able to be written due to time limitations; the tasks that were written probably tend to be more technical because they're easier to write than those pertaining to psychological and emotional support, etc.

The word "task" may not be the best term to use.

Determining how global or specific the criteria for identifying tasks are to be applied should be addressed at the beginning of the study. However this as well as common use of terms and other decisions were difficult to make until the method had been used and understood by the participants.

Describing attitudes using the guidelines for writing tasks was difficult.

The decision and/or planning to perform a task became a separate task from actually carrying out the activity.

Benchmark tasks were not identified by the entire group, limiting the reliability of how tasks were written.

It was difficult to determine how to describe tasks and judgements therein, universally rather than in relation to specific settings.

6 SUMMARY AND RECOMMENDATIONS

The purpose of conducting the Nursing Delineation Pilot Study was founded on valid criteria for responsible statewide planning of nursing education. One of the major advantages of the HSMS methodology as adapted for more feasible computer analysis is its ability to continually respond to changes in health care and education. Whenever new task data are generated, their influence on the original task groups and levels of practice would be readily computable and easily retrieved. Once the initial study is completed, it provides a mechanism for educators and practitioners to respond to the progress in health care through an objective means. Realistically, history has proven change to be inevitable. The Nursing Delineation Pilot Study suggests a viable alternative to dealing with the change process. The methodology should not be ignored and requires an investigative approach on a larger scale to ascertain its ability to meet the goals of ongoing, national delineation.

The Nursing Delineation Study Task Force believes the implementation of the methodology marks a major stride forward to cooperatively define the profession of nursing. While the volume of its work has been tremendous the task force made the following recommendations for further action.

(1) THE RESULTS OF THE STUDY (AS PRESENTED IN VOLUME 2 - 1982) SHOULD BE CONSIDERED REPRESENTATIVE OF NURSING AND THE STUDY SHOULD BE CONTINUED WITH A BROADER, MORE COMPREHENSIVE TASK FORCE MEMBERSHIP. CONSEQUENTLY, FUNDING SOURCES SHOULD BE SOUGHT FOR THIS PURPOSE.

Discussion: The tasks identified in the study are highly selective. The selectivity is a function of the people writing the tasks and the time limitations (both the time participants could allot to the project and the one-year timetable allotted to complete the project.) Additional work and time is needed to delineate the affective and intangible dimensions inherent in nursing (e.g., joy, love, compassion.)

The various types of clinical expertise were not adequately represented in the original task force members; therefore, the group should be expanded to specifically address the missing areas.

(2) EXISTING TASK DESCRIPTIONS FROM EACH OF THE AREAS (i.e., ADMINISTRATION, EDUCATION, PRACTICE, RESEARCH) SHOULD BE COMPARED FOR THEIR SCOPE AND APPLICATION OF TASK CRITERIA AND BE TESTED FOR RELIABILITY AMONG THE FOUR AREAS.

Discussion: Concentrated group process is more feasible for this type of comparison now that preliminary results are available

from all the task groups. Focus needs to be placed on the task rather than on the performer so that tasks are not defined on the basis of what, for example, a nurse educator does but rather on what a nurse does when teaching.

(3) IN FURTHER DEFINING NURSING BY CONTINUING THE STUDY, A CONCENSUS SHOULD BE REACHED ABOUT WHETHER WHAT HAS BEEN DEFINED IS OPTIMAL CARE VERSUS REQUIREMENTS FOR COMPETENT CARE.

Discussion: Discrepancies arose in interpreting and applying the criteria for defining tasks. If there is a difference between optimal and competent care, there should be a clear understanding of the meaning and parameters of both.

(4) THE STUDY SHOULD BE REPLICATED AND ORGANIZED ACCORDING TO THE PROCESSES OF ADMINISTRATION, EDUCATION, PRACTICE, AND RESEARCH.

Discussion: A study of this magnitude would probably require 2-3 years to complete. At the beginning of the study it would be instrumental to reach concensus about:

A) the scope of the study indicating task force membership make-up and size to accommodate attrition,
B) a conceptual framework for each group,
C) the scope of application of the term "task",
D) parameters of competent care versus optimal care,
E) how attitudes and values are to be expressed,
F) operational definitions of terms and selected activities,

G) expanding the Knowledge Classification System and review of skill and knowledge scales,

H) scheduling blocks of time for more concentrated work, and

I) sufficient time to effectively utilize external evaluators.

(5) THE COLLEGIAL INTERACTION OF THE TASK FORCE SHOULD REMAIN IN EXISTENCE AS A STATEWIDE FORUM WITH REPRESENTATION OF THE MULTIPLE AREAS OF SPECIALIZATION.

Discussion: The camaraderie fostered by the implementation of the Nursing Delineation Study is invaluable to the progress of nursing in Kentucky.

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APPENDIX A

Expertise of Task Force

TASK FORCE EXPERTISE* BREAKDOWN

Nomination No.	Clinical	Research	Administrative	Education	Organization
1	H	A,H	H	H	H
5	B,E,H,O,P			A,E,H	
9	A,B,I	A	A	A,I	A
11	G		G	B,G	G
13	I,P		I		
14	I,S		I		
15	B,F,G		B,G,H	B,F	G
16	A,C,I,J,K	I	A,C,T	A,T	C
20			A	A,F	A
21	C,D,I,J, N,O,P,T		C,D,I,J, N,O,P		
24	B,C,D,F, G,I,J,T		I,T	T	
27	I			I	I
30	H			H	
31	D			D	D
32	B,C,D,E, G,I	U	B,C,D,G	D,E,G,I,U	G,I
33	A,F			F	F
34	G	G		G	

*Code for areas of specialization is on following page.

AREAS OF SPECIALIZATION

A	Broad Background
B	Primary Care
C	Secondary Care
D	Tertiary Care
E	Pediatrics
F	Psychiatric
G	Public Health/Community Health
H	Maternal-Infant
I	Medical-Surgical
J	General Medicine
K	General Surgery
L	EENT
M	Gynocology
N	Urology
O	Neurology
P	Orthopedic
Q	Thoracic
R	Occupational Health
S	Critical Care
T	Gerontology
U	Rehabilitation

APPENDIX B

Delineation Study Timetable
1) Original
2) Actual

DELINEATION STUDY TIMETABLE

The original sequence of events were planned within a one year timeframe. However, the actual occurrence of events proved a much greater time scale was needed.

Month 1 - September, 1981

(A) Orient study group to methodology.
(B) Define "task."
(C) Distribute literature review results.
*(D) Write "task" list.

Month 2 - October

(A) Review (submit) task list.
(B) Introduce task description procedures.
*(C) Write task descriptions.

Month 3 - November

(A) Review (submit) task descriptions.
(B) Introduce procedures for skill scaling and annotation.
*(C) Scale tasks for skill and annotate.
*(D) Formalize task desciptions (staff).

Month 4 - December

(A) Review (submit) skill scalings/annotation.
(B) Introduce procedures for knowledge scaling and annotation.
*(C) Scale tasks for knowledge and annotate.
*(D) Formalize task desciptions (staff).

Month 5 - January, 1982

(A) Review (submit) knowledge scalings/annotation.
*(B) Submit scalings/annotations to key punch.
*(C) Submit task descriptions to key punch.

Month 6 - February

*(A) Validate task list and task packets including: task descriptions, scalings and annotations.
*(B) Review entire set of all "task packets."

Month 7 - March

*(A) Distribute validation results.
(B) Discuss/make revisions as appropriate.
(C) Submit revisions/additions to key punch.
*(D) Conduct cluster analysis and leveling procedures.

Month 8 - April

(A) Review cluster analysis procedure and results.
(B) Review leveling procedure and results.
(C) Discuss/review "curriculum outline" and "job descriptions."
(D) Accept/revise cluster and level results and job descriptions.
*(E) Submit revisions to key punch.

Month 9 - May

*(A) Review final results by cluster/level:
a) task descriptions,
b) job descriptions,
c) skill/knowledge requirements.
(B) Discuss strategies for identifying implications, applications and potential implementation.

Months 10-12 - June to August

(A) Discuss/refine results.
(B) Discuss strategies for identifying implications, applications and potential implementation.

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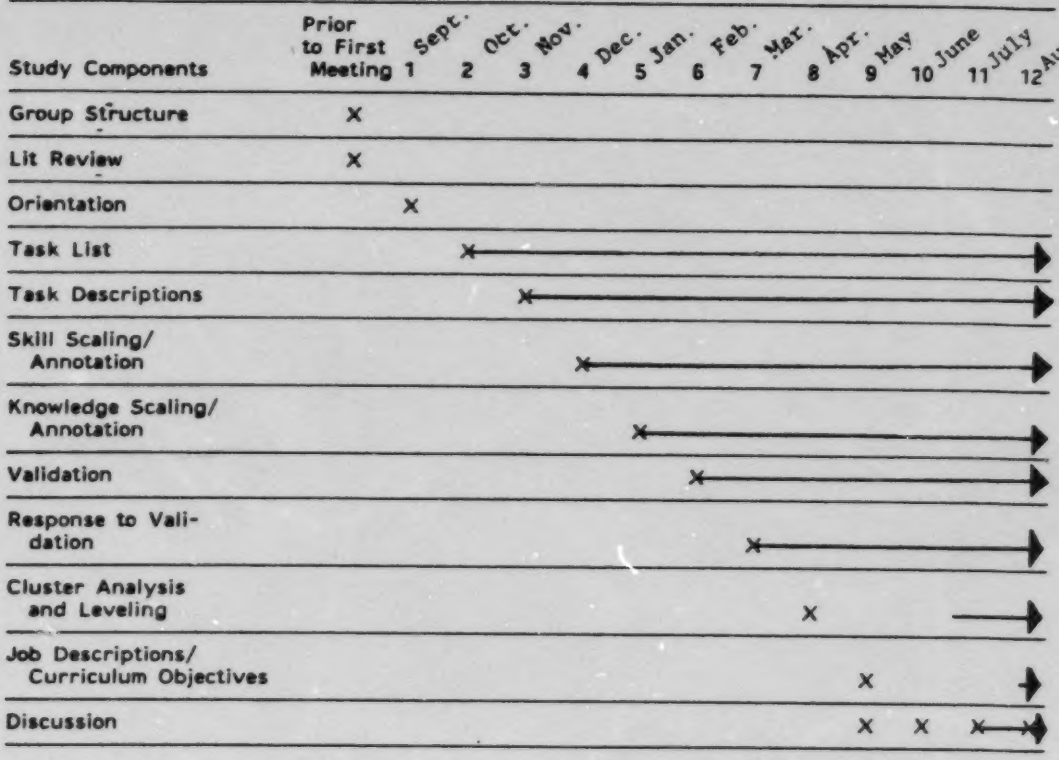
*These activities are actually conducted outside of group meetings.

Original Timetable

Study Components	Prior to First Meeting	1 Sept.	2 Oct.	3 Nov.	4 Dec.	5 Jan.	6 Feb.	7 Mar.	8 Apr.	9 May	10 June	11 July	12 Aug.
Group Structure	X												
Lit Review	X												
Orientation		X											
Task List			X										
Task Descriptions				X									
Skill Scaling/ Annotation					X								
Knowledge Scaling/ Annotation						X							
Validation							X						
Response to Validation								X					
Cluster Analysis and Leveling									X				
Job Descriptions/ Curriculum Objectives										X			
Discussion										X	X	X	X

Actual Timetable*



*The solid lines indicate the amount of time actually spent on the activities. The arrows represent the fact that the task force members felt the results after one year were representative and required more time and attention.

APPENDIX C

Skill Scales With Descriptors

Scale 1. TASK FREQUENCY

This scale refers to the frequency with which the task being scaled is executed by the performer. Tasks which are regularly done should be scaled by using the wording outside of the parentheses in the statements presented below. Tasks which are done infrequently or in concentrated periods during the year should be scaled by using the wording within the parentheses; the figures represent conversions to a normal work year.

SCALE VALUE	DESCRIPTIVE STATEMENT
0	Task is never done.
1	Task is done once per year or less.
2	Task is done more often than once per year, but less than once per month (no more than 11 times per year).
3	Task is done once per month or more, but less often than once per week (no more than 33 times per year).
4	Task is done once per week or more, but less often than once per day (no more than 180 times per year).
6	Task is done once per day or more, but less often than five times per day (no more than 912 times per year).
7	Task is done five times per day or more, but less often than ten times per day (no more than 2,052 times per year).
8	Task is done ten times per day or more, but less often than fifty times per day (no more than 11,172 times per year).
9	Task is done fifty times per day or more (11,173 times per year or more).

Note: This scale is not used for clustering tasks. Ratings on this scale are relevant only at the level of the institution.

Scale 2. LOCOMOTION

This skill refers to the degree of body coordination required of a performer in the task being scaled. The skill involves the movement of the performer's body, torso or limbs through space in order to achieve predetermined standards of body movement or position.

The level of the skill rises with the degree of body coordination required. This is determined by the complexity of the standards involved, or the complexity of external conditions which restrict motion. The scale level is not determined by requirements for strength nor by the level of knowledge which may be required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to move his body, torso or limbs through space so as to achieve a predetermined standard for body motion or position.
1.5	The task requires the performer to move his body, torso, or limbs through space so as to achieve simple, predetermined standard(s) for body motion or position. A small degree of body coordination is called for.
5.0	The task requires the performer to move his body, torso, or limbs through space so as to achieve somewhat complex, predetermined standards for body motion or position. A moderate degree of body coordination is called for.
7.0	The task requires the performer to move his body, torso or limbs through space so as to achieve considerably complex, predetermined standards for body motion or position. A high degree of body coordination is called for.
9.0	The task requires the performer to move his body, torso or limbs through space so as to achieve extremely complex, predetermined standards for body motion or position. An extremely high degree of body coordination is called for.

Scale 3. OBJECT MANIPULATION

This skill refers to the degree of control required of a performer in directly manipulating objects in the task being scaled. The skill involves the direct handling of objects using fingers, hands or limbs to achieve a predetermined standard.

The level of the skill rises with the degree of precision required and with the fineness of the manipulation involved. When fingers, hands or limbs manipulate an object in order to manipulate another object, the skill level reflects the direct manipulation involving the fingers, hands or limbs. The scale level is not determined by the level of knowledge needed to manipulate objects nor by the level of other manual skills or Figural Skills required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to directly handle objects with the fingers, hands or limbs so as to achieve a predetermined standard within constraints that require control and precision.
1.5	The task requires the performer to exercise a small amount of control and precision in directly manipulating objects with the fingers, hands or limbs in order to achieve a predetermined standard. Fairly gross motions are involved.
3.5	The task requires the performer to exercise a moderate amount of control and precision in directly manipulating objects with the fingers, hands or limbs in order to achieve a predetermined standard. Fairly gross motions are involved.
5.0	The task requires the performer to exercise a moderate amount of control and precision in directly manipulating objects with the fingers, hands or limbs in order to achieve a predetermined standard. Fairly fine motions are involved.
7.5	The task requires the performer to exercise a high degree of control and precision in directly manipulating objects with the fingers, hands or limbs in order to achieve a predetermined standard. Fairly fine motions are involved.
9.0	The task requires the performer to exercise a high degree of control and precision in directly manipulating objects with the fingers, hands or limbs in order to achieve a predetermined standard. Extremely fine motions are involved.

Scale 4. GUIDING OR STEERING

This skill refers to the degree of precision required of a performer in the task being scaled in moving an object over a predetermined pathway or holding steady on a moving target. The skill involves coordinating the performer's perceptions of external stimuli which tell him his position with his control of the object, in relation to the desired position or movement. The predetermined pathway or moving target may be actual or visualized.

The level of the skill rises as the precision needed rises (or the relative margin for error declines), and as the complexity of stimuli or the number of spatial directions or movements involved increase. The scale level is not determined by the degree of arm-hand steadiness involved, nor by the Figural Skills involved, nor by the level of knowledge required to accomplish the guiding or steering.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to move an object over a predetermined pathway or hold steady on a moving target.
1.5	The task requires the performer to move an object over a predetermined pathway or hold steady on a moving target. The movement requires a small degree of precision within a fairly large, acceptable relative margin of error. The performer must pay attention to a small number of external stimuli and/or spatial directions.
3.0	The task requires the performer to move an object over a predetermined pathway or hold steady on a moving target. The movement requires a small degree of precision within a fairly large, acceptable relative margin of error. The performer must pay attention to a fairly complex set of external stimuli and/or spatial directions.
5.5	The task requires the performer to move an object over a predetermined pathway or hold steady on a moving target. The movement requires a considerable degree of precision within a narrow, acceptable relative margin of error. The performer must pay attention to a fairly complex set of external stimuli and/or spatial directions.
7.0	The task requires the performer to move an object over a predetermined pathway or hold steady on a moving target. The movement requires a considerable degree of precision within a narrow, acceptable relative margin of error. The performer must pay attention to an extremely complex set of external stimuli and/or spatial directions.
9.0	The task requires the performer to move an object over a predetermined pathway or hold steady on a moving target. The movement requires a very high degree of precision within an extremely narrow, acceptable relative margin of error. The performer must pay attention to an extremely complex set of external stimuli and/or spatial directions.

Scale 5. HUMAN INTERACTION

This skill refers to the degree of sensitivity to others required of the performer in the task being scaled. The skill involves the performer's perception of the relevant characteristics or state of being of the other person(s), the performer's attention to feedback as the interaction occurs, and the performer's appropriate modification of his behavior so as to accomplish the task. The skill is involved if the task requires any personal contact or interaction with others.

The level of the skill rises as the degree of perceptiveness and sensitivity required of the performer rises, and as the subtlety of the feedback to which he or she must respond increases. The scale level is not determined by the level of knowledge required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to be in contact with or to interact with other people.
1.0	The task requires the performer to be in only general contact with other people. Very little sensitivity to or perception of the other person(s)' relevant general characteristics or state of being is required, and little awareness of very obvious feedback is required for the performer to adjust his behavior to perform the task.
3.0	The task requires the performer to interact with others in the performance of the task. The performer is required to be somewhat sensitive to or perceptive of the other person(s)' relevant general characteristics or state of being, and to be aware of very obvious feedback so as to adjust his behavior accordingly.
5.0	The task requires the performer to interact with others in the performance of the task. The performer is required to be quite sensitive to or perceptive of the other person(s)' relevant characteristics or state of being, and to be aware of fairly obvious feedback so as to adjust his behavior accordingly.
7.0	The task requires the performer to interact with others in the performance of the task. The performer is required to be keenly sensitive to or perceptive of the other person(s)' relevant characteristics or state of being, and to be aware of fairly subtle or complex feedback so as to adjust his behavior accordingly.
9.0	The task requires the performer to interact with others in the performance of the task. The performer is required to be keenly sensitive to or perceptive of the other person(s)' relevant characteristics or state of being, and to be aware of very subtle or very complex feedback so as to adjust his behavior accordingly.

Scale 6. LEADERSHIP

This skill refers to the degree to which leadership in interacting with subordinates is required on the part of the performer in the task being scaled. The skill is involved when the performer's task requires him to interact with subordinates so as to affect their work performance in order for the performer to achieve goals related to the task. The subordinate relationship may be de facto as well as formal.

The level of this skill rises in relation to three aspects of the performer's relationship with subordinates which are relevant to the task situation. These are: (1) power over subordinates' conditions of employment; (2) clearness of mutual channels of communication; and (3) clearness of subordinates' own relevant task procedures.

Low levels of Leadership are required when the performer has a great deal of power over the subordinates' conditions of employment, when the performer has very formal and clearly defined channels of communication with the subordinates relevant to the task situation, and when the tasks of the subordinates related to the performer's objectives are very clear cut, obvious, and require little discretionary judgment.

High levels of Leadership are required when the performer's power is low, when channels of communication are vague and undefined, and when the relevant subordinates' tasks are vague and require a great deal of discretionary judgment.

The level of Leadership required for the task being scaled is determined by the combination of ratings of high, medium or low for each of the three aspects. The parentheses for each statement indicate the various combinations for each scale value.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to relate to subordinates.
1.0	The task requires the performer to relate to subordinates in order to achieve work goals. The performer is understood to have a great amount of power over the related subordinates' conditions of employment. Channels of communication between the performer and the subordinates are very formalized and very well defined. The subordinates' related tasks are very clear cut, obvious and require little discretionary judgment. (Low range of Leadership needs on each of the three aspects. Also included: two lows and one medium.)

(continued on next page)

SCALE VALUE	DESCRIPTIVE STATEMENT
3.0	The task requires the performer to relate to subordinates in order to achieve work goals. The performer is understood to have a moderate amount of power over the related subordinates' conditions of employment. The channels of communication between the performer and the subordinates are somewhat formalized and moderately well defined. The subordinates' related tasks are very clear cut, obvious, and require little discretionary judgment. (Mid-range of Leadership needs on two out of the three aspects and low on a third. Also included: two lows and one high.)
4.5	The task requires the performer to relate to subordinates in order to achieve work goals. The performer is understood to have a moderate amount of power over the related subordinates' conditions of employment. The channels of communication between the performer and the subordinates are somewhat formalized and moderately well defined. The subordinates' related tasks are moderately clear cut, requiring some discretionary judgment. (Mid-range of Leadership needs on each of the three aspects. Also included: one low, one medium and one high; and two mediums and a high.)
6.5	The task requires the performer to relate to subordinates in order to achieve work goals. The performer is understood to have a moderate amount of power over the related subordinates' conditions of employment. The channels of communication between the performer and the subordinates are very informal, vague or irregular. The subordinates' related tasks are vaguely defined and require a great deal of discretionary judgment. (High rating for Leadership on two out of three aspects.)
8.5	The task requires the performer to relate to subordinates in order to achieve work goals. The performer is understood to have very little power over the related subordinates' conditions of employment. The channels of communication between the performer and the subordinates are very informal, vague or irregular. The subordinates' related tasks are vaguely defined and require a great deal of discretionary judgment. (High ratings for Leadership on all three aspects.)

Scale 7. ORAL USE OF A RELEVANT LANGUAGE

This skill refers to the level of precision in comprehension of heard language required of the performer in the task being scaled, and to the level of precision required in conveying meaning orally in the task situation. (The language referred to is the one in common use for the task.)

The level of this skill rises as the degree of precision in oral use of the language required in the task rises. The level of the scale is not determined by the knowledge reflected in the language used, nor by the skill of vocal delivery involved.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to understand spoken language or to speak.
2.0	The task requires the performer to understand and to convey meaning through the oral use of language. A low level of precision in choice of or comprehension of language is sufficient to accomplish the task.
4.0	The task requires the performer to understand and to convey meaning through the oral use of language. A moderate amount of precision in choice of or comprehension of language is necessary to accomplish the task.
7.5	The task requires the performer to understand and to convey meaning through the oral use of language. A fairly high degree of precision in choice of or comprehension of language is necessary to accomplish the task.
9.0	The task requires the performer to understand and to convey meaning through the oral use of language. A very high degree of precision and awareness of nuance in choice of or comprehension of language is necessary to accomplish the task.

Scale 8. READING USE OF A RELEVANT LANGUAGE

This skill refers to the level of comprehension required of the performer in his reading of written or printed material in the task being scaled. (The language referred to is the one in common use for the task.)

The level of this skill rises as the degree of precision in the reading use of the language required in the task rises. The level of this scale is not determined by the knowledge reflected in the material which is read.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to read and understand written language.
2.0	The task requires the performer to read and comprehend the general meaning of simple written language.
5.0	The task requires the performer to read and comprehend the general meaning of moderately complex written language.
7.0	The task requires the performer to read and comprehend the general meaning of complex written language.
9.0	The task requires the performer to read and comprehend the precise meaning and nuance of complex written language.

Scale 9. WRITTEN USE OF A RELEVANT LANGUAGE

This skill refers to the level of precision required of the performer in conveying meaning in the task being scaled through the written use of language. (The language referred to is the one in common use for the task.)

The level of this skill rises as the degree of precision in the written use of the language required in the task rises. The level of this scale is not determined by the knowledge reflected in the language used, nor by the level of knowledge of grammar or of literary form required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to write language.
2.0	The task requires the performer to convey general meaning by writing in simple language.
5.0	The task requires the performer to somewhat precisely convey meaning by writing in moderately complex language.
6.5	The task requires the performer to fairly precisely convey meaning by writing in complex language.
9.0	The task requires the performer to very precisely convey meaning by writing in very complex language.

Scale 10. DECISION MAKING ON METHODS

This skill refers to the degree of responsibility required of a performer with respect to decisions he must make about how he does the task being scaled. How the task is done (the method) includes what is done, when, in what order, what is used, and who is involved. When the performer has any amount of latitude in deciding how to do the task, the skill is involved.

The skill rises as the choice of methods in the task situation are less and less obvious or specified; the skill rises as the circumstances of the task from one instance to another are more and more varied. The level of this scale is not determined by the level of knowledge required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The performer is not required to decide on how to do any part of the task.
1.5	The performer is required to decide how to do all or part of the task. Instances of the task vary little with respect to the methods to choose from, and once the situation is known, the performer's choice is obvious and/or specified.
3.0	The performer is required to decide how to do all or part of the task. Instances of the task vary little with respect to the methods to choose from, and the performer's choice is arrived at by referring to general guidelines for choosing an appropriate method.
4.5	The performer is required to decide how to do all or part of the task. Instances of the task vary somewhat with respect to the methods to choose from, and the performer's choice is arrived at by referring to general guidelines for choosing an appropriate method.
7.0	The performer is required to decide how to do all or part of the task. Instances of the task cover a wide range of circumstances calling for very different methods, and the performer's choice is arrived at by referring to general guidelines for choosing an appropriate method.
9.0	The performer is required to decide how to do all or part of the task. Instances of the task cover a wide range of circumstances calling for very different methods, and once the situation is assessed, the performer must make his choice by applying his own guidelines for selecting an appropriate method.

Scale 11. DECISION MAKING ON QUALITY

This skill refers to the degree of responsibility required of the performer with respect to decisions he must make about the quality of the output he produces in the task being scaled. The scale refers to the performer's latitude beyond the minimum acceptable levels of task performance. The skill is involved when the performer has any effect on the quality of the task's output beyond minimum requirements.

The skill rises with the extent to which the performer can affect the output's quality. It is also affected by whether or not the output is subject to review or inspection by others before it is used. The level of this scale is not determined by the level of knowledge required nor by the possibility of making errors.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The performer is unable to affect the quality of the task's output.
1.5	The performer's exercise of choice in his standards of task performance can have only a minor effect on the quality of the task's output beyond minimum requirements, and the output is subject to complete and automatic review or inspection by someone else before it is used.
2.0	The performer's exercise of choice in his standards of task performance can have only a minor effect on the quality of the task's output beyond minimum requirements, and the output is subject to review or inspection by someone else before it is used.
3.5	The performer's exercise of choice in his standards of task performance can have only a minor effect on the quality of the task's output beyond minimum requirements, and the output is not subject to review or inspection by anyone else before it is used.
5.5	The performer's exercise of choice in his standards of task performance can have considerable effect on the quality of the task's output beyond minimum requirements, but the output is subject to review or inspection by someone else before it is used.
7.0	The performer's exercise of choice in his standards of task performance can have considerable effect on the quality of the task's output beyond minimum requirements, and the output is not subject to review or inspection by anyone else before it is used.
9.0	The performer's exercise of choice in his standards of task performance can completely determine the quality of the task's output due to the absence of minimum requirements, and the output is not subject to review or inspection by anyone else before it is used.

Scale 12. FIGURAL SKILLS

This skill refers to the level of complexity required of the performer in the task being scaled in dealing with figural aspects of materials. The skill involves the mental manipulation of figural properties in order to achieve a predetermined figural standard or objective. The figural aspects involved are limited to size, shape, form, or arrangement of materials in relation to space, whether the mental images involved or the materials dealt with are static or in motion. A figural standard would involve norms or criteria for size, shape, form or their arrangements in space.

The skill rises as the complexity of the figural standards which must be achieved to perform the task rise, and as the complexity of the figural relationships whose aspects the performer must deal with rise. The level of this scale is not determined by the level of knowledge nor by the level of manual skills required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to achieve a figural objective or standard involving size, shape, form, or arrangement of materials in relation to space, whether static or in motion.
1.0	The task requires the performer to achieve simple figural objectives, or meet simple figural standards involving the size, shape, form, or arrangement of materials in relation to space, whether static or in motion. The materials which are perceived or conceived of are dealt with in terms of their simple figural relationships.
3.5	The task requires the performer to achieve moderately complex figural objectives, or meet moderately complex figural standards involving the size, shape, form, or arrangement of materials in relation to space, whether static or in motion. The materials which are perceived or conceived of are dealt with in terms of their simple figural relationships.
5.0	The task requires the performer to achieve moderately complex figural objectives, or meet moderately complex figural standards involving the size, shape, form, or arrangement of materials in relation to space, whether static or in motion. The materials which are perceived or conceived of are dealt with in terms of their moderately complex figural relationships.
7.0	The task requires the performer to achieve moderately complex figural objectives, or meet moderately complex figural standards involving the size, shape, form, or arrangement of materials in relation to space, whether static or in motion. The materials which are perceived or conceived of are dealt with in terms of their highly complex figural relationships.
9.0	The task requires the performer to achieve highly complex figural objectives, or meet highly complex figural standards involving the size, shape, form, or arrangement of materials in relation to space, whether static or in motion. The materials which are perceived or conceived of are dealt with in terms of their highly complex figural relationships.

Scale 13. SYMBOLIC SKILLS

This skill is called for when the performer is required by the task being scaled to manipulate or use abstract symbols which are part of a system of symbolic notation. The skill involves the use of or manipulation of symbolic properties in such systems as numerical, musical, or code notations. The skill does not involve the semantic meaning or the figural properties of the symbols, nor use of single, one-to-one symbols which are not part of a system of notation, nor use of representational symbols.

The skill rises with the degree of complexity of the manipulation or use made of the symbols and with the complexity of the symbolic properties of the symbols. The level of this scale is not determined by the level of knowledge or subject matter represented by the symbols, nor by the figural properties of the symbols involved.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to manipulate or use abstract symbols which are part of a system of notation.
1.5	The task requires the performer to manipulate or use in simple operation(s), simple abstract symbols which are part of a system of notation.
3.5	The task requires the performer to manipulate or use in simple operation(s), fairly complex, abstract symbols which are part of a system of notation.
5.0	The task requires the performer to manipulate or use in fairly complicated operations(s), fairly complex, abstract symbols which are part of a system of notation.
7.0	The task requires the performer to manipulate or use in fairly complicated operation(s), highly complex, abstract symbols which are part of a system of notation.
9.0	The task requires the performer to manipulate or use in highly complicated operation(s), highly complex, abstract symbols which are part of a system of notation.

Scale 14. TAXONOMIC SKILLS

This skill is called for when the performer is required by the task being scaled to consciously apply or create conceptual classifying or organizing principles. The skill involves the application of mental processes to assign an unknown set of information to existing conceptual classes or systems, or the creation of conceptual classes or systems to suit the needs of the task. The skill does not involve the use of intuitive judgment, the use of simply figural or symbolic principles, or the one-to-one matching of obvious characteristics.

When conceptual organizing or classifying principles are to be applied, the skill rises with the level of complexity of the principles. When conceptual organizing or classifying principles are to be created, the skill rises with the level of complexity of the purposes they must serve in the task. The level of this scale is not determined by the level of knowledge nor by the level of the other intellectual skills required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to consciously apply or create conceptual principles of classification or organization.
2.0	The task requires the performer to consciously apply simple conceptual principles of classification or organization; or to create conceptual principles with which to organize or classify information to suit simple needs in the task situation.
5.5	The task requires the performer to consciously apply somewhat complex conceptual principles of classification or organization; or to create conceptual principles with which to organize or classify information to suit somewhat complex needs in the task situation.
7.0	The task requires the performer to consciously apply considerably complex conceptual principles of classification or organization; or to create conceptual principles with which to organize or classify information to suit considerably complex needs in the task situation.
9.0	The task requires the performer to consciously apply extremely complex conceptual principles of classification or organization; or to create conceptual principles with which to organize or classify information to suit extremely complex needs in the task situation.

Scale 15. IMPLICATIVE SKILLS
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This skill is called for when a performer must come to conclusions or draw implications in the task being scaled which go beyond the memorization of cause and effect relationships or simple associations. The skill involves the application of mental processes to deal with a set of information so as to draw non-routine conclusions or inferences or to foresee consequences in the performance of the task.

The skill rises with the degree of complexity of the information with which the performer must deal in drawing implications, and rises with the extent to which the kinds of information from which the conclusions or inferences are to be drawn vary from one instance of the task to another. The level of this scale is not determined by the seriousness of the errors in judgment which could be involved, nor by the level of knowledge, nor by the level of other intellectual skills required.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to go beyond memorization of cause and effect relationships or simple associations to draw conclusions or inferences from a set of information.
1.0	The task requires the performer to go beyond memorization of cause and effect relationships or simple associations to draw conclusions or inferences from a set of relatively straight-forward or uncomplex information. The kinds of information from which the conclusions or inferences must be drawn vary little from one instance of the task to another.
2.0	The task requires the performer to go beyond memorization of cause and effect relationships or simple associations to draw conclusions or inferences from a set of relatively straight-forward or uncomplex information. The kinds of information from which the conclusions or inferences must be drawn vary somewhat from one instance of the task to another.
4.0	The task requires the performer to go beyond memorization of cause and effect relationships or simple associations to draw conclusions or inferences from a set of moderately complex information. The kinds of information from which the conclusions or inferences must be drawn vary little from one instance of the task to another.
5.0	The task requires the performer to go beyond memorization of cause and effect relationships or simple associations to draw conclusions or inferences from a set of moderately complex information. The kinds of information from which the conclusions or inferences must be drawn vary somewhat from one instance of the task to another.

(continued on next page)

SCALE VALUE	DESCRIPTIVE STATEMENT
8.0	The task requires the performer to go beyond memorization of cause and effect relationships or simple associations to draw conclusions or inferences from a set of extremely complex or extremely ambiguous information. The kinds of information from which the conclusions or inferences must be drawn vary somewhat from one instance of the task to another.
9.0	The task requires the performer to go beyond memorization of cause and effect relationships or simple associations to draw conclusions or inferences from a set of extremely complex or extremely ambiguous information. The kinds of information from which the conclusions or inferences must be drawn vary a great deal from one instance of the task to another.

Scale 16. FINANCIAL CONSEQUENCES OF ERROR

This skill refers to the degree of responsibility carried by a performer with respect to the financial damage which could result from errors in his performance of the task being scaled. The error whose consequences would be rated would be the most serious likely error to be expected from a performer qualified to do the task. The skill is involved if errors in performance of the task have any financial consequences involving any output, equipment, materials, time or other chargeable items. The level of this scale is not determined by the value of insurance claims or damage suits which would result from harm to humans.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	No likely error in the performer's task performance could result in financial damage to the institution.
1.0	The most serious likely error in the performer's task performance would result in negligible financial damage to the institution.
4.0	The most serious likely error in the performer's task performance would result in financial damage to the institution of a relatively moderate but manageable amount.
6.0	The most serious likely error in the performer's task performance would result in financial damage to the institution of an amount considered to be relatively difficult to absorb.
7.5	The most serious likely error in the performer's task performance would result in financial damage to the institution of an amount considered to be extremely serious and extremely difficult to absorb.
9.0	The most serious likely error in the performer's task performance would result in financial damge to the institution of an amount so serious that the institution would cease to exist.

Scale 17. CONSEQUENCES OF ERROR TO HUMANS

This skill refers to the degree of responsibility carried by the performer with respect to the harm which could be done to humans as a result of errors in his performance of the task being scaled. The error whose consequences are rated would be the most serious likely error to be expected from a performer qualified to do the task. The skill is involved if errors in performance of the task result in any physical or mental harm to humans, including recipients, respondents, co-workers, or persons not directly related to the task. The performer is included. The level of this scale is not determined by any financial harm which could be done to persons.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	No likely error in the performer's task performance could result in harm to a human.
1.0	The most serious likely error in the performer's task performance would result in physical or mental inconvenience.
2.0	The most serious likely error in the performer's task performance would result in very minor physical or mental harm, requiring little or no remediation.
3.0	The most serious likely error in the performer's task performance would result in minor physical or mental harm and would require remediation or treatment.
5.5	The most serious likely error in the performer's task performance would result in considerable physical or mental harm and would require remediation or treatment.
7.0	The most serious likely error in the performer's task performance would result in very serious physical or mental harm, or would put the affected person in danger of minor permanent damage.
8.0	The most serious likely error in the performer's task performance would result in serious permanent damage beyond the help of remediation or treatment.
9.0	The most serious likely error in the performer's task performance would result in immediate and inevitable death.

APPENDIX D

Knowledge Scale With Desciptors

Scale 18. LEVELS OF KNOWLEDGE
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This scale refers to the level of knowledge in a given subject category required of the performer in the task being scaled. The knowledge category is rated with this scale. To be rated above zero on the scale the task must require knowledge beyond the simple memorization of the overt steps of the task.

The scale rises with the amount of detailed knowledge which must be consciously applied and with the depth of understanding required in the subject area, in terms of the subject area's content, the structure of its ideas, and its uses. "Detailed knowledge" covers such things as technical or special terms or facts. "Consciously applied" means that the performer is able to (but need not) articulate his use of the knowledge in the task situation.

The level of knowledge for a category is not determined by the level of any intellectual skills required, nor by the level for any other knowledge category required for the task, nor by the level of the category required for any other tasks of the job involved.

SCALE VALUE	DESCRIPTIVE STATEMENT
0.0	The task does not require the performer to consciously apply knowledge in this subject category which has been gained in a learning experience requiring more than the memorization of the overt steps of the specific task being scaled.
1.5	The task requires that the performer consciously apply a limited amount of detailed knowledge in this subject category, including such things as technical or special terms, facts or equipment.
2.5	The task requires that the performer have a general awareness of this subject category in terms of its content, the structure of its ideas, and its uses. The performer must consciously apply a limited amount of detailed knowledge in this subject area, including such things as technical or special terms, facts or equipment.
3.5	The task requires that the performer have a general awareness of this subject category in terms of its content, the structure of its ideas, and its uses. The performer must consciously apply a moderate amount of detailed knowledge in this subject area, including such things as technical or special terms, facts or equipment.

(continued on next page)

SCALE VALUE	DESCRIPTIVE STATEMENT
5.5	The task requires that the performer have a considerable degree of understanding of this subject category in terms of its content, the structure of its ideas, and its uses. The performer must consciously apply a moderate amount of detailed knowledge in this area, including such things as technical or special terms, facts or equipment.
7.0	The task requires that the performer have a considerable degree of understanding of this subject category in terms of its content, the structure of its ideas, and its uses. The performer must consciously apply a very great amount of detailed knowledge in this subject area, including such things as technical or special terms, facts or equipment.
8.0	The task requires that the performer have a very deep understanding of this subject category in terms of its content, the structure of its ideas, and its uses. The performer must consciously apply a moderate amount of detailed knowledge in this subject area, including such things as technical or special terms, facts or equipment.
9.0	The task requires that the performer have a very deep understanding of this subject category in terms of its content, the structure of its ideas, and its uses. The performer must consciously apply a very great amount of detailed knowledge in this subject area, including such things as technical or special terms, facts or equipment.

APPENDIX E

Sample of the
Knowledge Classification System

THE KNOWLEDGE CLASSIFICATION SYSTEM

OF THE

HEALTH SERVICES MOBILITY STUDY

ADAPTED FOR THE

NURSING DELINEATION STUDY

September 1981 - August 1982

SYMBOLS USED IN THE KNOWLEDGE SYSTEM

(_____) Underline represents "broad level category" which can be identified for tasks.

(#) Number sign represents "fine level category" which can be identified for tasks.

(*) Asterisk represents acknowledgment that category obviously requires additional subdivisions.

(SS) See Special Section on Category Characteristics for comments on this category.

THE KNOWLEDGE CLASSIFICATION SYSTEM
of the
Nursing Delineation Study

CONTENTS OF ONE, TWO AND THREE DIGIT LEVELS

Natural Sciences . . . . . .

Biological Sciences . . . . . .
History of the biological sciences . . . . . .
Genetics . . . . . .
Evolution . . . . . .
Biogeography . . . . . .
Ecology . . . . . .
Zoology . . . . . .
Microbiology . . . . . .
Molecular biology . . . . . .
Cell biology (cytology and histology) . . . . . .
Radiobiology and radiology . . . . . .
Pharmacology . . . . . .
Chemistry . . . . . .
Physical chemistry . . . . . .
Properties and electronic structure of elements . . . . . .
Molecular structure . . . . . .
Properties of classes of compounds . . . . . .
Biochemical processes and mechanisms . . . . . .
Applied chemistry . . . . . .
History of chemistry . . . . . .
Physics . . . . . .
History of physics . . . . . .
Theoretical physics . . . . . .
Applied physics . . . . . .
Geosciences . . . . . .
Geography . . . . . .
Atmospheric sciences . . . . . .
Water sciences . . . . . .
Minerology . . . . . .
Geochemistry . . . . . .

Engineering and Technology . . . . . .

Continuum Mechanics . . . . . .
Engineering Thermodynamics . . . . . .
Applied thermodynamics . . . . . .
Engineering Kinetics . . . . . .
Electrical Engineering . . . . . .
Electrical science . . . . . .
Reliability and Quality Control in Engineering Processes . .
Air Conditioning and Heating Technology . . . . . .
Electronics Technology . . . . . .

CONTENTS (Continued)

Engineering and Technology (Continued)

Computer Technology . . . .
Audio (Sound Equipment) Technology . . . .
Agricultural Technology . . . .
Materials . . . .
Metals . . . .
Coal . . . .
Soaps, detergents and cleaning preparations . . . .
Glass . . . .
Cordage, twine, thread and fibers . . . .
Fabrics (cloth) . . . .
Plastics . . . .
Rubber . . . .

Social Sciences . . . .

Behavioral Sciences . . . .
History of anthropology . . . .
History of psychology . . . .
History of sociology . . . .
Demography . . . .
Methodology and research techniques in the behavioral sciences . . . .
Behavioral processes of the individual . . . .
Social processes and social structures . . . .
Education . . . .
Educational foundations . . . .
Curriculum design . . . .
Systems of content presentation . . . .
Educational administration . . . .
Stages of education . . . .
Specialized education . . . .
Special education . . . .
Educational guidance (counselor education) . . . .
Economics . . . .
Economic history and philosophy . . . .
Micro-economics . . . .
Macro-economics . . . .
International economics . . . .
Economic growth, development and planning . . . .
Labor, manpower and human resources . . . .
Consumer economics . . . .
Regional and urban economics . . . .
Quantitative economics . . . .
Industrial organization . . . .
Political Science . . . .
Political history . . . .
Systemic analysis . . . .
Institutional political analysis . . . .

CONTENTS (Continued)

Social Sciences (Continued)

Mathematics and Related Disciplines . . . . . .

Mathematics . . . . . .
Mathematical analysis . . . . . .
Topology . . . . . .
Geometry . . . . . .
Probability and Statistics . . . . . .
Probability and stochastic processes . . . . . .
Statistics . . . . . .
Cybernetics and Computer Sciences . . . . . .
Cybernetics . . . . . .
Computer Sciences . . . . . .

Humanities and the Arts . . . . . .

Philosophy . . . . . .
Systematic philsophy . . . . . .
Historical philosophy . . . . . .
Religion . . . . . .
Systematic and doctrinal religion . . . . . .
Sacred writings and love . . . . . .
Religious worship . . . . . .
Comparative religion . . . . . .
Religious traditions and sects . . . . . .
Literature . . . . . .
History of literature and of literary criticism . . . . . .
The Arts . . . . . .
Environmental design . . . . . .
Visual art . . . . . .
Writing . . . . . .
Law . . . . . .
Legislation . . . . . .
Interpersonal law . . . . . .
State individual law . . . . . .
History . . . . . .
Linguistics and Language . . . . . .
Linguistics . . . . . .
Languages (other than English) . . . . . .

Other Disciplines . . . . . .

Library Science . . . . . .
Food Service . . . . . .

Special Section on Category Characteristics . . . . . .

1 2 3 4 5 6 7 8

10000000 NATURAL SCIENCES

11000000 BIOLOGICAL SCIENCES

11100000 # History of the biological sciences*

11200000 # Genetics (For molecular and microbial genetics see Molecular biology.)*

11300000 # Evolution*

11400000 # Biogeography*

11500000 # Ecology (Includes ecosystems and conservation.) (For the physical aspects of air pollution see GEOSCIENCES, CHEMISTRY, PHYSICS, and ENGINEERING AND TECHNOLOGY, for the health aspects of pollution see Community health and preventive medicine and Epidemiology.)

11700000 # Zoology

11720000 # Vertebrate zoology (through mammalia, but excluding humans)*

11730000 Human zoology

1173100 SS Normal structure and function (The categories listed below include both anatomy and physiology except where otherwise specified.)

11731100 SS # Regional anatomy (Includes head and neck, thorax and abdomen, pelvis and perineum, lower and pper limbs, and skeleton.)

1173120 SS # Topographic anatomy (relation of external manifestations to internal structure and function, e.g. location of pressure points, surface appearance of joints, muscles and bones.)

11731300 SS # Hematopoietic system (Includes blood, red and white blood cells, platelets, and bone marrow, liver and spleen in their blood forming function, and nutritional implications.)

11731400 # Circulatory system (cardiovascular system) (Includes heart, veins, arteries, lymphatics, and nutritional implications.)

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11731500 SS # Respiratory system.

11731510 Upper respiratory system (Includes nasal cavity, paranasal sinuses, and the pharynx in its respiratory function.)

11731520 Lower respiratory system (Includes larynx, trachea, and bronchi.)

11731530 Lungs and diaphragm

11731600 SS # Digestive system

11731610 SS # Mouth, pharynx (digestive function), and esophagus (Includes tongue, teeth, and salivary glands.)

11731620 # Stomach and small intestine (Includes duodenum, jejunum, ileum.)

11731630 # Large intestine (colon) and rectum (Includes appendix, anus, and mesentery.)

11731640 # Liver, biliary system, and pancreas (Includes gall bladder, cystic duct, bile duct, pancreatic duct, ampulla of Vater.)

11731700 # Urinary system (Includes kidney, ureter, bladder, urethra, external genitalia.)

11731800 # Musco-skeletal system

11731810 # Muscles

11731820 # Bones and joints (Includes ligaments and tendons.)

11731830 Integument

11731831 # Skin and sweat glands

11731832 # Hair

11731833 # Nails

11731900 # Nervous system

11731910 # Central nervous system (brain and spinal cord)

11731920 # Peripheral nervous system

	1	2	3	4	5	6	7	8	
11731930	SS					#			Autonomic nervous system (Includes sympathetic and parasympathetic nerves.)
11731940									Organs of special senses. (See also Sensation in BEHAVIORAL SCIENCES.)
11731941							#		Olfactory nerve and receptors
11731942							#		Taste buds
11731943							#		Eye and optic nerve
11731944							#		Touch, heat, cold and pain receptors
11731945							#		The ear (Note that this category excludes balance function.)
11731946							#		Kinesthetic receptors (Includes semicircular canals.)
11732100	SS					#			Immunologic system (Includes immunological mechanisms, humoral and cellular factors.)
11732200						#			Endocrine system and reproduction.
11732210							#		Endocrine glands and their hormone physiology (Includes pituitary, adrenal, thyroid, parathyroid, pineal, and pancreas, ovary and testes in their endocrine functions.)
11732220							#		Reproduction
11732221								#	Conception and contraception
11732222								#	Male reproductive system
11732223								#	Female reproductive system (Includes the body changes associated with ovulation, conception and pregnancy, e.g. development of placenta.) (For development of the embryo see growth and development.)
11732300						#			Homeostasis of fluids (Includes fluid and electrolyte balance and covers processes involving the body's maintenance of normal states; nutritional implications.

One should identify this category only when it is needed in its own right, apart from or in addition to a given system of the body.)

11732400 # Metabolism (Includes the physiological and chemical processes by which the human living organism ingests, digests, produces energy, and grows, and includes the coordination of the various physiological processes and their mechanisms. This category should be used only when it is required in its own right, apart from or in addition to a specific system of the body.)

11733000 SS Pathology (abnormal function and structure) (Includes the etiologic and diagnostic aspects of disease.) (See also First aid for emergency treatment and care and Radiobiology in the BIOLOGICAL SCIENCES.)

11733100 # Infective and parasitic diseases

11733200 # Neoplasms (cancerous growths)

11733300 # Endocrine, nutritional, and metabolic disorders

11733400 # Disorders of blood and blood-forming organs

11733500 Disorders of the nervous system and sense organs (For mental disorders, see Psychopathology in the BEHAVIORAL SCIENCES.)

11733510 # Disorders of the central nervous system

11733520 # Disorders of the peripheral nervous system

11733530 # Disorders of the autonomic nervous system

11733540 Disorders of the organs of special senses

11733541 # Disorders of the olfactory nerve and receptors

11733542 # Disorders of the taste buds

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11733543						#		Disorders of the eye and optic nerve
11733544						#		Disorders of touch, heat, cold and pain receptors
11733545						#		Disorders of the ear
11733546						#		Disorders of kinesthetic receptors
11733600					#			Disorders of the circulatory system
11733700					#			Disorders of the digestive system
11733800					#			Disorders of the respiratory system
11733900					#			Disorders of the uro-genital system
11734100					#			Disorders of the skin and subcutaneous tissues
11734200					#			Disorders of the musculoskeletal system and connective tissues
11734300					#			Congenital abnormalities
11734400					#			Disorders and complications of pregnancy, childbirth and the puerperium
11734500	SS				#			Perinatal morbidity and mortality (shortly before or after birth)
11734600					#			Burns
11734700					#			Poisoning
11734800	SS				#			Shock and trauma
11735000	SS				Surgery			
11735100					#			Operative procedures (Also includes biopsy, removal of tumors, removal of organs, Caesarian section, removal of drains.)
11735200					#			Amputation and disarticulation
11735300					#			Repair surgery (Includes plastic surgery, pedicle revision, surgical graft, anastomosis, fistulization, open reduction, fixation, fusion, stabilization.)
11735400	SS				#			Introductory procedures (Includes injections, transfusion, irrigation, catheterization, intubation, tracheotomy.)

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11735500 # Endoscopy (direct visual observation of bronchi, esophagus, duodenum, colon, etc. with an endoscope)

11735600 # Suture (Also includes ligature, suture materials.)

11735700 SS # Manipulation (Includes application of plaster, splint or traction, dilation or stretching.)

11735800 # Delivery methods for childbirth (Includes the circumstances governing the delivery method chosen such as abnormal presentation of baby (transverse section, breech), medical history of mother.) (For complications of childbirth caused by other conditions see Pathology, Normal structure and function.)

11736000 # Anesthesiology (Includes open anesthetics, semiopen, insufflation, absorption, intravenous, infiltration, field and nerve block methods.) (For administering anesthesia see also Surgery.)

11737000 First aid and care (See also Pathology.)

11737100 SS # Bandages, dressings, tourniquets and splints

11737200 # Hemorrhage and bleeding and their arrest

11737300 # Handling and transportation of the sick or wounded

11737400 SS # Sprains, strains, fractures and their healing

11737500 # Foreign bodies not involving wounds (in eye, throat)

11737600 # Resuscitation

11737700 SS # Wounds and their healing (Also includes operative incisions.)

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11738000 SS # Asepsis (concepts and techniques involved in achievement of sterile condition) (Includes concurrent and terminal disinfection during surgery, aspects of sterilization of implements and equipment such as autoclaving.)

11738100 # Medical Asepsis

11739000 Community health and preventive medicine. (Includes community nutrition. For health education see topics of instruction and EDUCATION.)

11739100 # Treatment of social causes of illness (primary level of prevention) (See also SOCIAL SCIENCES.)

11739200 # Making diagnosis, referral and treatment available (secondary level of prevention)

11739300 # Rehabilitation and restoration of individual to community (tertiary level of prevention) (See also Behavioral processes and Rehabilitation medicine.)

11739400 Health aspects of environmental pollution (For physical aspects see NATURAL SCIENCES, ENGINEERING AND TECHNOLOGY and GEOSCIENCES.)

11739410 # Air and water pollution*

11739420 # Noise pollution

11739430 SS # Sanitation (establishment and maintenance of environmental conditions which are favorable to health) (Includes methods of waste disposal, sanitary considerations for food and drink, insect and rodent control.) (For clinical sterilization techniques see Asepsis.)

11740000 # Physical Assessment

11741000 # Epidemiology (relationship of factors which determine the frequencies and distributions of infectious processes, diseases or other pathological states (e.g. lead poisoning) in human communities) (Also includes immunization.) (See also Asepsis and Pathology.)

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11742000 # Rehabilitation medicine (For normal functioning and diseases see Normal structure and function and Pathology; for physical education see EDUCATION for the teaching techniques involved and the appropriate categories for topics of instruction.)

11742100 SS Physical therapy (Excludes speech therapy and hearing therapy.) (See also Mental retardation in the BEHAVIORAL SCIENCES and Special education in EDUCATION.)

11742110 # Kinesiology and body mechanics (See also Musculo-skeletal system; for disability see Disorders of the musculo-skeletal system.)

11742120 # Disability evaluation (testing and measurement to determine the extent and type of physical disability) (For psychological tests see BEHAVIORAL SCIENCES.)*

11742130 Treatment types

11742131 # Amputation adjustments (Includes artificial limbs and their use and artificial organs [where relevant] and their use.) (Note that this category excludes surgical procedures.)*

11742132 SS # Corrective, preventive and compensatory adjustments (Includes supportive and self-help devices and their use, such as wheel chairs, trusses, crutches and other mechanical devices and special measures to restore functioning, prevent malfunction (e.g. after surgery), and to make use of partial functions.)*

11742133 SS # Special post-disease and chronic disease therapy (special corrective procedures for the after-effects of diseases such as heart disease, rheumatic fever, epilepsy, blindness, diabetes, pulmonary tuberculosis.)*

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11742140 Treatment modalities (for physical disabilities)

11742141 # Hydrotherapy (Includes whirlpool baths.)

11742142 # Electrotherapy (use of electric current for therapeutic purposes)

11742143 # Heat therapy (Includes diathermy, infra-red, ultra-violet.)

11742144 # Deep heat therapy (Includes short wave, micro-wave, ultrasound.)

11742145 # Fever therapy (production of artificial fever for therapeutic purposes)

11742146 # Cold therapy (therapeutic use of cold)

11742147 # Massage (systematic manipulation of body tissues for therapeutic purposes)

11742148 # Exercise (corrective therapeutic and normal) (Includes active, passive and stretching, active assistance; isometric, progressive resistive (proprioceptive, isotonic), coordination and balance, breathing, prenatal and post partum, gait-training and locomotion exercise.)

11742149 # Therapeutic recreation

11742151 # Vocational rehabilitation (Refers only to the physical therapy aspects of vocational rehabilitation.) (See also Psychotherapy and counselling in the BEHAVIORAL SCIENCES.)

11742200 Speech therapy and hearing therapy (See also Normal structure and function, PHYSICS and LINGUISTICS.)

11742210 # Speech therapy*

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11742220 # Hearing therapy*

11743000 Nutrition and dietetics (See also CHEMISTRY, Normal structure and function, Cell biology.)

11743100 # Biochemistry of nutrients (Includes carbohydrates, fats, proteins, minerals, vitamins, water.)

11743200 # Physiology of nutrients (Includes carbohydrates, fats, proteins, minerals, vitamins, water.)

11743300 # Nutritional qualities of foods (Includes losses resulting from processing, the relationship between foods their preparation.

11743400 # Normal nutritional requirements and diets (Includes aspects of normal nutrition for adults, pregnancy and lactation infancy, childhood, adolescence, and geriatrics.)

11743500 # Diet Therapy

11743510 # Abnormal nutritional requirements and diets (Includes aspects of therapeutic nutrition for adults, pregnancy and lactation, infancy, childhood, adolescence, and geriatrics.)

11743600 # Composition of food (Includes nutrient breakdown by individual food and by groups of Basic Foods.)

11744000 Dentistry (See also Anesthesiology.)

11744100 # Oral hygiene and care (See also Asepsis.)

11744200 # Oral surgery (surgical and adjunctive treatment of diseases, injuries, and defects of the mouth, the jaws, and associated structures) (Includes fillings, pedontics, and corrective devices such as dentures, crowns, bridges.) (See also Surgery.)

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11744300 # Orthodontics (prevention and correction of irregularities of the teeth and malocclusion, and with associated facial problems)

11745000 Growth and development (Note that age ranges are approximate.) (For psychological aspects of growth and development see Behavioral processes.)

11745100 # Embryology and prenatal period (For experimental embryology see Cell biology.) (See also Chemical teratogenesis.)

11745200 # Neonatal period (birth through 1st month)

11745300 # Infant growth (2nd month through 2nd year)

11745400 # Childhood growth

11745500 # Adolescent growth

11745600 # Adulthood

11745700 # Old age (geriatrics)

11746000 Biological Rhythm

11746100 Human Sexuality

11745800 # Death and dying

11800000 # Microbiology (Includes physiology of microorganisms such as protozoa, fungi, algae, bacteria.) (For parasitology see Infective and parasitic diseases.)

11900000 # Molecular biology (Includes viruses; the genetics of bacteria, and molecular and microbial genetics.) (For biophysical aspects of molecular biology see CHEMISTRY.)

12100000 Cell biology (cytology and histology)

12110000 # Cell morphology (structure)

12120000 # Cell physiology

12130000 # Cyto-chemistry (histo-chemistry)

12140000 # Neurobiology (cellular level)

12141000 Adrenergic systems

12142000 Cholinergic systems

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12150000 # Developmental biology (Includes experimental embryology.)

12151000 Cell-cell interactions

12152000 Control of differentiation and specialization of tissues

12200000 Radiobiology and radiology

12210000 # Radiobiology (effects of high energy radiation on living organisms) (Includes effects of ionizing electromagnetic, ultraviolet, sonic and particulate radiation.) (Also includes biological safety requirements and protection.) (For specific technological applications see appropriate categories under CHEMISTRY, PHYSICS, ENGINEERING AND TECHNOLOGY. For specific disease and functional effects of radiation see also Normal structure and function, Pathology, Genetics, Cell biology.)

12220000 Radiology (diagnostic and therapeutic application of radiant energy including electromagnetic and particulate radiation) (See also CHEMISTRY, PHYSICS, ENGINEERING AND TECHNOLOGY, Normal structure and function, Pathology, First aid and care, Radiobiology, for all categories listed below.)

12221000 # Radiotherapy (application of electromagnetic and particulate ionizing radiation to living organisms for therapeutic purposes) (Includes determination of course of treatment and administration of treatment.)

12222000 # Radionuclide therapy (part of nuclear medicine; internal application of unsealed sources of particulate radiation (radioactive materials) to living organisms for therapeutic purposes) (Includes determination of course of treatment and use of radionuclides.)

12223000 # Diagnostic radiography (application of electromagnetic ionizing radiation such as x-rays to achieve interpretable images for diagnostic purposes) (Also includes fluoroscopy, use of related techniques, contrast media, procedures, positioning, interpretation of images.)

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12224000 # Radionuclide analysis (part of nuclear medicine; internal application of unsealed radioactive nuclides to living organisms for the purpose of diagnosis or investigation) (Includes use of radioisotope scanning (tracer techniques), related procedures, positioning.) (See also Radiochemical analysis, Radiochemistry.)

12300000 SS Pharmacology (the study of drugs, i.e. chemical compounds or non-infectious biological substances which may be administered as an aid in the diagnosis, treatment or prevention of disease, for the relief of pain or suffering, or to control or improve any physiological or pathological condition) (See also Normal structure and function, Pathology, Cell biology and CHEMISTRY.)

12310000 Molecular mechanisms of drug action

12311000 # Drug receptor theory (Includes bond types in drug receptor interaction.)

12312000 # Drug structure-activity relationships

12313000 # Drug dose-response relationships

12314000 # Non-receptor mediated drug action

12320000 Drug physiology and chemistry (See also Normal structure and function, Pathology, Cell biology and CHEMISTRY.)

12321000 # Drug absorption (Includes physiochemical nature of the drug, physiochemical nature of absorbing membrane, route of administration.)

12322000 # Drug distribution (Includes volume of distribution, drug-plasma protein interaction, drug-membrane interactions, drug deposition and storage.)

12323000 # Drug excretion (Includes physiochemical nature of the drug, routes of elimination.)

12324000 # Drug metabolism (Includes oxidation, reduction, hydrolysis, conjugation.)

12330000 Adverse effects of drugs and responsible mechanisms (See also Normal structure and function, Pathology, Cell biology and CHEMISTRY.)

12331000 SS # Drug toxicity (Includes antidotal therapy.)

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12332000	SS			#				Drug idiosyncrasy and allergy pharmacogenetics (Includes increased sensitivity to drugs, decreased responsiveness to drugs, novel drug effects, etc., which are due to inherited physical characteristics.)
12333000				#				Drug resistance (of a non-genetic nature) (Includes mutational origins. (For biochemical mechanisms, see CHEMISTRY.)
12334000				#				Drug tolerance and physical dependence (Includes homeostatic adjustment, cumulative effects, tolerance at the site of drug action.)
12335000	SS			#				Drug synergism (presence of two or more drugs in the body having interaction effects and the change in drug action this causes.)
12336000				#				Chemical teratogenesis (special effects of drugs on the fetus during pregnancy)
12337000	SS			#				Chemical mutagenesis (drugs which induce mutation, a discontinuous inheritable change in the quality of the offspring, used to inhibit growth of malignant tissues by destroying or modifying the genes.)
12338000				#				Chemical carcinogenesis (the range of drugs which can induce tumors.)
12340000				Drug classes (See also Normal structure and function, Pathology, Cell biology and CHEMISTRY wherever applicable.)				
12341000					Drugs acting on foreign invaders			
12341100						#		Antibacterial and antifungal chemotherapy (Includes antiseptics and germicides, sulfonamides, penicillins, erythromycin, tetracyclines and broad spectrum antibiotics, streptomycin, sulfoes, antifungal agents.)
12341200						#		Antiprotozoal/antimetazoal chemotherapy (Includes antimalarials, amebicides, heavy metals, metal-binding agents, antimonials, anthelmintics.)
12341300						#		Cancer and virus chemotherapy (Includes alkylating agents, antimetabolites, steroids and enzymes, interferon induction.)

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12341400 # Local chemotherapy (Includes insecticides, repellents, and rodenticides, topical agents.)

12342000 Drugs acting on somatic systems

12342100 # Drugs acting on the cardiovascular system and smooth muscle (Includes cardiac glycosides, quinidine and anti-arrhythmia agents, coronary vasodilators, diuretics, agents inhibiting the renal tubules, fluids (such as blood, substitutes, electrolytes), agents in atherosclerosis, hypotensive agents, smooth muscle relaxants, smooth muscle stimulants.)

12342200 # Drugs acting on the blood (Includes agents in anemia, anticoagulants and coagulants.)

12342300 # Hormones and drugs acting on endocrine glands and accessory reproductive organs (Includes adrenal cortical hormones and corticotropin, thyroid and thyrotropic hormones, sex hormones and gonadotropins, anterior pituitary, agents in diabetes mellitus, parathyroid hormone and calcium metabolism.)

12342400 # Vitamins and nutritional agents (Refers only to the pharmaceutical aspects.) (Includes vitamins, agents in nutrition and obesity. (For nutritional and dietary aspects see Nutrition and dietetics.)

12342500 # Drugs influencing growth and development.

12342600 SS # Drugs for allergy, cough, vomiting and the dermatomucosal surfaces (Includes anti-immune drugs, antitussives, antiemetics, dermatomucosal agents.)

12342700 # Drugs acting on the gastrointestinal tract (Includes drugs effective in ulcer therapy, cathartics and laxatives, digestants and drugs useful in gallbladder disease.)

12342800 # Drugs acting on the nervous system (For anesthetics see Anesthesiology.)

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12342810 # Drugs acting on the automonic nervous system (Includes sympathetic stimulants, sympathetic depressants, parasympathetic stimulants, parasympathetic depressants, ganglionic agents.)

12342820 # Drugs acting on the neuromuscular system (Includes myoneural agents, muscle relaxants.)

12342830 # Drugs acting on the central nervous system (Includes narcotic analgesics, non-narcotic analgesics, sedatives and hypnotics, anticonvulsants, tranquilizers, drug addiction, alcohol, psychomimetic agents, drugs affecting the mind.)

12342900 # Drugs acting on the immunologic system

12343000 Pain Theories

13000000 CHEMISTRY

13100000 SS Physical chemistry

13110000 # Molecular quantum mechanics

13111000 Numerical wave functions (Includes ab initio and semi-empirical theories.)

13112000 Empirical bonding and structure theories (Includes valence, bond and molecular orbital theories.)

13120000 # Scattering and transmission of isolated molecules

13121000 Scattering theory (Includes classical and relativistic theory of rainbow, glory and orbiting phenomena.)

13122000 Molecular beam scattering (Includes neutral and ion beams, electron impact.)

13123000 Photoionization and photodetachment

13130000 # Molecular spectroscopy and light scattering

13131000 Luminescence (Includes flourescence, phosphorescence, lifetimes, spectral intensities.)

	1	2	3	4	5	6	7	8	
13132000									Fine and hyperfine structure analysis (Includes infra-red, ultraviolet, visible and Raman spectroscopy.)
13133000									Coherent effects and resonance spectroscopy (Includes spin-couplings, lasers.)
13134000									Bulk electric and magnetic moments (Includes dielectric constants, refractive indices, optical rotation.)
13140000				#	Thermodynamics				
13141000									Thermochemistry (calorimetry)
13142000									Free energy and entropy calculation (via cyclical processes)
13143000									Phase equilibria and colligative properties (Includes boiling and melting points, vapor pressure, phase diagrams, osmosis, solubilities.)
13144000									Irreversible thermodynamics (non-cyclical processes)
13150000				#	Electrochemistry				
13151000									Conductance and ionic reactions (Includes Faraday's laws, conductivity, ionization theory, transport numbers, ionic strength and activity coefficients.)
13152000									Electro-chemical cells (Includes cell electro-motive force (EMF) measurement, electrolytic cells, galvanic cells, polarography, Nernst equation.)
13160000				#	Kinetics (reaction mechanisms)				
13161000									Reaction rate determination and analysis of mechanisms (Includes reaction order and molecularity, rate constants, kinetic re-laxation theory, steady state theory, chain reactions.)
13162000									Reaction rate theory (Includes collision theory, transition state theory, isotope effects, homogeneous catalysis, rate inhibition.)
13163000									Energy transfer mechanisms (Includes photore-laxation, intersystem crossing, quenching, photo-sensitization.)

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13164000 Photochemistry and photochemical reactions (Includes actinometry, flash photolysis, primary and secondary processes.) (See also Molecular spectroscopy and light scattering.)

13170000 # Surface chemistry

13171000 Chemical and physical adsorption (Includes contact catalysis, competitive adsorption, Langmuir adsorption isotherm, Brunauer-Emmett-Teller (BET) equation.)

13172000 Surface tension and monolayers (Includes Gibbs adsorption isotherm and surface balance.)

13180000 # Macromolecules (only the physical chemistry aspects of macromolecules)

13181000 Molecular weight determination theory (Includes osmosis techniques, Donnan effect, Rayleigh effect, ultracentrifuge, viscosity theory.)

13182000 Configuration and physical properties (Includes elasticity, crystallinity as they determine chemical behavior.)

13190000 # Radiochemistry

13191000 # Hot atom chemistry (Includes isotope separation, recoil effects, radiolysis, chemical dosimetry.)

13192000 # Tracers (Also includes use of Geiger counters, scintillation counters, autoradiography, isotope exchange and isotopic dilution analysis.)

13193000 # Gamma-ray spectroscopy

13210000 # Kinetic theory of gasses (Includes Charle's, Boyle's and Van der Waal's equations, mean free path, gas viscosity, Avagadro's number, molecular effusion.)

13300000 Properties and electronic structure of elements

13310000 Properties of elements (Includes chemical and physical properties of the elements and their isotopes by the vertical groups of the periodic table, individual common light elements and heavier elements of specialized interest.)

13311000 # Properties of oxygen

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13312000 # Properties of hydrogen

13313000 # Properties of nitrogen

13314000 # Properties of the inert gases (Includes helium, neon, krypton, argon, xenon, radon.)

13315000 # Properties of the halogens (Includes flourine, chlorine, bromine, iodine, astatine.)

13316000 # Properties of sulfur, selenium, tellurium, polonium

13317000 # Properties of phosphorus, arsenic, antimony, bismuth

13318000 # Properties of carbon

13319000 # Properties of silicon, germanium

13321000 # Properties of tin

13322000 # Properties of lead

13323000 # Properties of the alkali metals (Includes lithium, potassium, sodium, rabidium, cesium, francium.)

13324000 # Properties of the alkaline earth metals (Includes calcium, magnesium, beryllium, strontium, barium, radium.)

13325000 # Properties of aluminum

13126000 # Properties of boron

13327000 # Properties of gallium, indium, thallium

13328000 # Properties of scandium, yttrium

13329000 # Properties of vanadium, niobium, tantalum

13331000 # Properties of chromium, molybdenum, tungsten

13332000 # Properties of iron, cobalt, nickel

13333000 # Properties of platinum, osmium, irridium, ruthenium, rhodium, palladium

13334000 # Properties of copper, silver, gold

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13335000 # Properties of zinc, cadmium, mercury

13336000 # Properties of titanium, zirconium, hafnium

13337000 # Properties of manganese, technetium, rhenium

13338000 # Properties of the lanthanide series (Includes 15 elements.)

13339000 # Properties of the actinide series (Includes 15 elements.)

13340000 Electronic structure of elements and their isotopes (Includes quantum mechanics at the elemental level and electronic basis of spectral and chemical properties of elements.) (See also Molecular quantum mechanics, Molecular spectroscopy and light scattering, Radiochemistry.)

13400000 Molecular structure (See also Molecular quantum mechanics, Molecular spectroscopy, Molecular diffraction.)

13410000 # Chemical bonding (Includes electronic formulas, resonance theory, molecular orbital theory, coordinate covalent bonding, ligand field theory, and structure determination using spectral theory.)

13420000 # Stereochemistry (structure of organic and inorganic compounds; the 3-dimensional spatial arrangement of atoms in a molecule) (Includes geometrical and optical isomerism, point groups, optical rotatory dispersion, circular dichroism, microwave spectroscopy.) (See also Molecular spectroscopy and Macromolecules under Physical chemistry.)

13500000 Properties of classes of compounds (For nutritional qualities of compounds see Nutrition and dietetics in BIOLOGICAL SCIENCES; for pharmacological properties see Pharmacology in BIOLOGICAL SCIENCES.)

13510000 # Inorganic acids

13520000 # Inorganic bases

13530000 # Inorganic salts

13540000 # Complexes of heavy metal ions (coordination compounds)

13550000 # Alkanes (saturated hydrocarbons)

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13560000 # Unsaturated hydrocarbons (Includes alkenes and alkynes.)

13570000 # Organometallic compounds (Includes mercurochrome, merthiolate, Grignard reagent.)

13580000 # Organic sulphur compounds (Refers to organic sulphur compounds other than sulphur limido.)

13590000 # Aromatic hydrocarbons (Includes benzene, its homologues and their derivatives.) (Note that this category excludes the amines and organometallic compounds.)

13610000 # Organic heterocyclic ring compounds (Includes furan and derivatives, pyrrole and derivatives, indole and derivatives, thiazole and derivatives (including penicillins), pyran and derivatives, pyridine and derivatives, pyrimidine and derivatives, and purines except when they are biochemical, e.g., vitamins, proteins, nucleic acids, or alkaloids.)

13620000 # Alkaloids

13630000 # Aliphatic alcohols

13640000 # Aromatic alcohols (Includes phenols and cresols but excludes sterols.)

13650000 # Aldehydes and ketones and derivatives (Note that this category excludes the aromatic aldehydes/ketones and the polyhydroxy aldehydes/ketones and carbohydrates.)

13660000 # Carboxylic acids, salts, esters and amides of carboxylic acids (Note that this category excludes amino and fatty acids.)

13670000 # Amines and derivatives (Includes analine and derivatives, phenacetin.) (Note that this category excludes the sulfanimides.)

13680000 # Sulfanimides

13690000 # Ethers (Note that this category excludes heterocyclic and aromatic ethers.)

13710000 # Halides (Includes carbon tetrachlorides, choloroform, "Freon", other than aromatic and heterocyclic halides.)

1	2	3	4	5	6	7	8	
13720000			#					Peroxides
13730000			#					Quinones
13740000			#					"Sandwich" (ferrocene-like) compounds and cage compounds
13750000			#					Carbohydrates (Includes monosaccharides (simple sugars) and their derivatives, oligosaccharides, disaccharides such as cane sugar and lactose, polysaccharides such as starch.)
13760000			#					Proteins and related compounds
13761000								Amino acids
13762000								Oligopeptides
13763000								Polypeptides (Includes synthetic and biological polypeptides.)
13770000			#					Nucleic acids
13771000								Nucleosides and nucleotides (Includes oligo-nucleotides, polynucleotides.)
13772000								DNA (deoxyribonucleic acid) and RNA (ribonucleic acid) (Note that this category excludes replication.)
13780000			#					Lipids
13781000								Fatty acids (saturated and unsaturated)
13782000								Fatty acid esters (Includes oils, fats.)
13783000								Fatty acid salts (Includes soaps.)
13784000								Phospholipids, sphingolipids, cerebrosides
13790000			#					Steroids (Includes cholesterol and adreno-cortical hormones, sex hormones.)
13810000			#					Vitamins and other co-factors
13900000								Biochemical processes and mechanisms
13910000			#					Photosynthesis (Includes chlorophyls and related pigments.)
13920000								Intermediary metabolism (small molecules)

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13921000 # Biosynthesis (anabolism) and biodegradation (catabolism)

13921100 Biosynthesis and biodegradation of sugars

13921200 Biosynthesis and biodegradation of amino acids

13921300 Biosynthesis and biodegradation of fatty acids

13921400 Biosynthesis and biodegradation of purines, pyrimidines, nucleotides, and nucleosides

13921500 Biosynthesis and biodegradation of steroids

13922000 # Krebs cycle

13923000 # Glycolysis and fermentation

13924000 # Electron transport chain

13930000 # Biosynthesis and degradation of macromolecules

13931000 # DNA and RNA replication

13932000 # Proteins

13933000 # Carbohydrates

13934000 # Lipids

13935000 # Membranes

13936000 # Bacterial and plant cell walls

13940000 # Control mechanisms of biochemical processes (Includes feedback, inhibition and activation, repression and induction of enzyme synthesis, allosteric interaction.)

13950000 # Mechanisms of enzyme activity (Includes enzyme kinetics, binding of small molecules, catalytic mechanism.)

14100000 Applied chemistry

14110000 Heterogeneous matter (solutions and colloids)

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14111000 SS # Solutions (mechanical, optical, colligative properties; dilute, normal, molar, saturated and supersaturated solutions, whether liquid, solid or gaseous phase) (For analytical tests relying upon one or more of these properties see Chemical analysis and preparation of samples.) (See also Phase equilibria and colligative properties in Thermodynamics.)

14112000 # Colloids (one type of matter dispersed through another type of matter in units larger than molecules) (Includes those alloys which are not solutions.)

14112100 Hydrosols (solids, gasses or liquids in liquids, such as, suspensions, emulsions, foams, lathers, froths)

14112200 Solid disperols (liquids, gasses or solids dispersed through solids, such as, alloys, gels, solid foams)

14112300 Aerosols (solids or liquids in gasses, such as, smokes, fogs, mists)

14120000 SS Chemical analysis and preparation of samples (See also Empirical bonding and structure theories and MATERIALS.)

14121000 SS # Mechanical analysis (tests of mechanical properties of matter) (Includes gravimetrics, weight and specific gravity, strength, hardness, brittleness, ductility; microscopic analysis of physical properties.) (See also Descriptive physics for physical knowledge of properties.)

14122000 # Thermal analysis (measuring differences in temperature in different parts of a sample or with passing of time) (Includes thermal titrometry, thermal tests, differential thermal tests.) (See also Heat flow in PHYSICS.)

14123000 # Electrical analysis and electrodeposition (analytic methods involving electric current or potential (voltage) condition in relation to sample condition) (See also Electric circuit theory, Solid state physics.)

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14124000 # Radiochemical analysis (use of radioactive isotopes as tracers in reactions; also, use of radiation as reaction activators) (See also Radiochemistry, Kinetics, Properties and electronic structure of elements, Nuclear structure, Radionuclide analysis.)

14125000 # Optical analysis (Includes photometric, refractometric, interferometric, polarimetric and spectometric methods.) (For knowledge of the physical properties measured in these tests see Optical properties in PHYSICS.) (See also Molecular spectroscopy and light scattering, Kinetics, Optics, Solid state physics.)

14126000 # Neutralization and oxidation/reduction methods

14127000 # Volumetric analysis (determination by titration with standard solutions and indicators)

14128000 SS # Separation methods in analysis (Includes selective absorption, distillation and evaporation, extraction by solvents, separation by ion exchange, chromatography and diffusion analysis, precipitation methods.) (See also Electrometric methods, Colloids, Solutions, Electrical analysis and electrodeposition, Surface chemistry, Kinetic theory of gasses, Fluid dynamics, and Statistical physics.)

14200000 # History of chemistry*

15000000 PHYSICS (For the mathematical knowledge used, see MATHEMATICS AND RELATED DISCIPLINES.)

15100000 # History of physics*

15200000 Theoretical physics (study of physics in terms of models)

15210000 Classical subjects

15211000 Classical mechanics (forces acting on objects and the motions produced thereby)

15211100 # Statics (study of balanced forces producing no motion in the bodies on which they act) (Includes loads, stress and strain, virtual work, equilibrium under forces.)

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15211200 # Dynamics of rigid bodies (operation of forces in producing or changing the motion of bodies) (Includes friction, action of levers, velocity, acceleration, momentum, work, energy, angular momentum-flywheel, rotation-torque, precession-gyroscopic principle, harmonic motion-pendulum.)

15211300 # Gravitation (Includes Newton's law, mass, weight in proporation to the acceleration of gravity, weightlessness in orbit, planetary orbits, trajectory of a projectile.)

15212000 Parametrized dynamics

15212100 # Electric circuit theory (Includes Ohm's law, Kirchhoff's laws, impedance, inductance, resistance, amperage, voltage, potentiometry, bridges, alternating and direct current, wave-guides, transmission.)

15213000 Classical field theory (involves fields, which are properties (e.g. temperature, magnetic attraction, viscosity) which exist everywhere within a continuous volume of space)

15213100 # Electrical and magnetic fields (Includes electrostatic charge, Coulomb's law, energy in an electromagnetic field, forces on a charge distribution, forces on a current distribution, permanent magnets, magnetic field due to electric currents, Maxwell's field equations.)

15213200 # Plasma physics (Includes electrical neutrality in a plasma, particle orbits and drift motion in a plasma, magnetic mirrors, hydromagnetic equations, pinch effect, plasma oscillations and wave motion.)

15213500 # Fluid dynamics (Includes hydrodynamics, viscosity, irrotational flow, turbulence.) (For super fluids see also Quantum mechanics.)

15213600 # Heat flow (Includes heat conductivity, convection, radiative transfer, Fourier's theory of heat.)

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15214000 Classical wave theory

15214100 # Acoustics (Includes sound, compression waves, sound propagation, Doppler effect.)

15214200 # Optics (Includes electromagnetic radiation, spectra, infrared, light, ultraviolet, x-ray radiation, polarization of light, reflection and refraction, black-body radiation, lasers, radiation from an oscillating charge distribution.)

15214300 # Radio waves

15220000 Modern subjects

15221000 Quantum mechanics (modern study of energy, especially as emitted in radiation) (See also Optics.)

15221100 # Potential theory (Includes energy levels in a potential well, central-force problems, particle waves, Schroedinger wave equations, atomic wave functions, ordinary quantum mechanics of single or several particles.)

15222000 Atomic theory (the physics of atoms) (For molecular physics and structure of elements see Physical chemistry.)

15222100 # Atomic structure (Includes nuclear atom model, electronic energy levels, magnetic spin-orbit interaction.)

15222200 # Atomic radiation processes (Includes ionization potentials, line spectra-transitions between electronic energy levels, forbidden lines, Zeeman effect, Stark effect, band structure-rotational spectra.)

15222500 # Interaction with radiation (Includes inversion spectra-absorption of microwave radiation.)

15223000 Nuclear theory (the physics of the nuclei of atoms)

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15223100 # Nuclear structure (Includes composition, binding energies, energies of excited states, saturation of internucleon forces, charge independence of nuclear forces, isotopic spin, instability of nuclear states, exchange forces, nuclear moments, shell model, L-S coupling model, independent particle model, collective model, mass defects, periodicity of stable islands.)

15223200 # Nuclear reactions (Includes stripping reactions, fission, fusion alpha decays, beta decays, x-ray emission, internal conversion, optical model, liquid drop model, statistical model, compound nuclear model; neutron moderation; also includes scattering processes such as elastic and inelastic scattering, resonance processes, muon and neutrino capture, photoproduction, star production.)

15224000 Particle theory (the physics of sub-atomic particles, some of which make up atoms and nuclei) (See also Nuclear reactions, Atomic structure.)

15230000 Statistical physics (statistical mechanics) (For the statistics involved see Statistics.)

15231000 # Equilibrium (study of effects and properties of a multitude of particles taken as a whole) (Includes Gibb's ensemble, partition function, fluctuations, Maxwell velocity distribution, mean free path, kinetic theory of gases.)

15232000 # Transport (gross) (Includes statistical theory of viscosity, electric conductivity, thermal conductivity.) (See also ENGINEERING AND TECHNOLOGY.)

15233000 # Particle and quasi-particle behavior (Includes BCS theory of super-conductivity, phonons, excitons.)

15234000 # Liquid and solid state application (Includes defects, solution activities.)

15240000 Solid state physics (For technological applications, see ENGINEERING AND TECHNOLOGY.)

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15241000 # Crystallography and x-ray diffraction

15242000 # Free electron theory of metals (Includes conductivity.)

15243000 # Energy-band theory of solids (Includes allowed electronic energy levels, effectively formed bands, wide gap between bands--insulator, narrow gap--semi-conductor.)

15244000 # Ionic crystals (Includes dielectric constant, electronic energy levels, lattice imperfections, ionic conductivity, photographic emulsions.)

15245000 # Flow of electrons and holes in semiconductors

15246000 # Photoelectric effect (changes in the electrical characteristics of a material exposed to light)

15247000 # Therminic emission (emission of charged particles from a heated surface)

15248000 # Phase transitions in solids

15300000 Applied physics

15310000 Macroscopic matter

15311000 # Mechanical properties (Includes coefficient of friction, strength, hardness, elasticity.) (See also ENGINEERING AND TECHNOLOGY.)

15312000 # Thermal properties (Includes specific heat, coefficient of expansion, thermoelectric effect, dependent of resistance on temperature, heat transfer, heat refraction, radiation, absorption.) (See also Equilibrium and Transport of Statistical physics.)

15313000 # Electrical properties (Includes conductivity, dielectric constant, piezoelectricity, ferroelectricity, electrolytic conductivity, Hall effect.) (See also Electrical and magnetic fields, ENGINEERING AND TECHNOLOGY.

15314000 # Magnetic properties (Includes permeability, diamagnetism, paramagnetism, permanent magnetization, Curie or Neelpoint, hysteresis.) (See also Electrical and magnetic fields, ENGINEERING AND TECHNOLOGY.)

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15315000 # Optical properties (Includes transparency, index of refraction; prism action; filters; double refraction, dispersion, absorptive edges, flourescence, phosphorescence; geometrical optics (ray tracing); Snell's law, image formation, focal points, correction of an optical system.) (See also Optics of Classical wave theory and Interaction with radiation.)

15320000 Submicroscopic matter

15321000 # Atomic lattice structure (Includes Bragg angles, lattice symmetries, internuclear distances.) (See also Solid state physics.)

15322000 # Particle acceleration (Includes Cockcraft-Walton, Van de Graaf, betatron, cyclotron, linear accelerator, strong focusing accelerator.)

15323000 # Strange particle production and decays (Includes masses, lifetimes, decay parameters, symmetries, symmetry breaking mechanisms.) (See also Weak interactions and Symmetries of Particle theory.)

15324000 # Resonances (strong interactions) (Includes production mechanisms, symmetries, cross-sections.) (See also Symmetries and Scattering matrix theory of Particle theory.)

17000000 GEOSCIENCES (The categories listed below refer to knowledge specific to the geosciences.) (For knowledge of the physics, chemistry, biology, mathematics, engineering, etc. involved with knowledge of some of the categories listed under GEOSCIENCES, see appropriate categories listed under NATURAL SCIENCES, MATHEMATICS AND RELATED DISCIPLINES, ENGINEERING AND TECHNOLOGY.)

17200000 Geography (geographic conditions, events and distributions) (For study of the physical processes involved see Atmospheric science, Water sciences, Land structure and processes.) (For Human geography see appropriate categories in SOCIAL SICENCES.)

17220000 # Physical geography (geographic conditions, distributions and their history)*

17[illegible]0000 Atmospheric science (Covers the traditional sciences of meteorology, aeronomy, and marine meterorology.)

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17500000 Water sciences (oceanography and hydrology; salt and fresh water) (Marine biology would appear in the BIOLOGICAL SCIENCES if categories were broken out to greater detail.)

17550000 # Fresh water geochemistry* (See also CHEMISTRY.)

17560000 # Water characteristics (Includes water density and temperature, optical and acoustical characteristics) (See also Optical properties, Acoustics, Fluid dynamics, Thermal properties.)

17590000 # Water distribution (Includes runoff and soil percolation to streams, percolation to groundwater, spring outflow, water storage, dissolved material in water, bed load, saltation.)

17600000 # Minerology*

17700000 # Geochemistry (Note that this category excludes chemical oceanography, astrochemistry and fresh water geochemistry.)*

20000000 ENGINEERING AND TECHNOLOGY (See also PHYSICS, CHEMISTRY and
SS MATHEMATICS AND RELATED DISCIPLINES.)

21000000 CONTINUUM MECHANICS

22000000 ENGINEERING THERMODYNAMICS (See also Physical chemistry.)

22200000 Applied thermodynamics

22230000 # Refrigeration cycles (Includes air conditioning, refrigeration plants, cooling towers.)

23000000 # ENGINEERING KINETICS (Includes chemical reactor design.) (See also Physical chemistry.)

24000000 ELECTRICAL ENGINEERING (See also PHYSICS, Classical field theory; Solid state physics and plasmas.)

24100000 Electrical science (physics-oriented aspects of electrical engineering)

24110000 # Electromagnetic field theory applications (Includes electromagnetic devices and energy conversion.)

24113000 Electromagnetic radiation sources and transmission

24113100 # Microwaves and waveguides

1 2 3 4 5 6 7 8

24113200 # Radio and telemetry

24113300 # Antennas

24120000 Applied acoustics (For acoustics of speech and music see LINGUISTICS.)

24124000 # Ultrasonics

24130000 # Electronics

24131000 # Physical electronics

24132000 Applied electronics

24132100 # Electronic devices

24200000 Systems theory (electrical) (For general systems theory see CYBERNETICS.)

24210000 # Network theory (electrical)

24215000 # Power systems

24220000 # Control systems (electrical) (For classical system design theory see Control theory in CYBERNETICS.)

24230000 Communication systems (electrical) (See also CYBERNETICS AND COMPUTER SCIENCES.)

25000000 PROCESS, PLANT, AND MECHANICAL SYSTEMS

25100000 # Process simulation (setting up a model of a process to study the effects of parameter variations) (For statistical aspects see MATHEMATICS AND RELATED DISCIPLINES.)

25200000 # Process optimization (study of a process to determine the optimum method of design of operation) (For statistical aspects see MATHEMATICS AND RELATED DISCIPLINES.)

26000000 # RELIABILITY AND QUALITY CONTROL IN ENGINEERING PROCESSES
(Includes nondestructive testing, acceptance testing.)
(For mathematical or statistical aspects see MATHEMATICS AND RELATED DISCIPLINES.)*

31000000 # AIR CONDITIONING AND HEATING TECHNOLOGY (See also Fan, blower and compressor systems, Heat exchange and furnace systems, Vapor power cycles, Refrigeration cycles, Pneumatic control systems, Electromagnetic field theory; Chemical thermodynamics, Evaporation systems, Reactive systems.

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32000000 # ELECTRONICS TECHNOLOGY (Includes electronic systems such as radio and television.) (See also Applied electronics, Electromagnetic radiation sources and transmission, Microwaves and waveguides, Radio and telemetry, Antennas, Electromagnetic field theory applications.)

33000000 # COMPUTER TECHNOLOGY (See also Computer design, Electronics.)

34000000 # AUDIO (SOUND EQUIPMENT) TECHNOLOGY (See also Applied acoustics, Electronics technology.)

35000000 # AGRICULTURAL TECHNOLOGY (Includes methods of cultivation and agricultural equipment.)*

36000000 SS MATERIALS (Includes those aspects of materials related to their application in productive processes.)

36200000 Metals

36210000 # Metal ores (Includes ferrous metal ores and non-ferrous metal ores in their natural state or in their use in the creation of processed metals.)

36220000 # Processed metals (Includes ferrous and non-ferrous processed metals as raw materials or as fabricated products.)

36300000 # Coal (Includes anthracite, bituminous, lignite and tars.)

36400000 # Crude petroleum

36500000 # Natural gases

36600000 # Oils

36700000 # Soaps, detergents and cleaning preparations.

37200000 # Clay (Includes ceramic and earth substances.)

37300000 # Natural and chemical fertilizer substances

37400000 # Glass

37500000 # Cordage, twine, thread and fibers (Includes fibers in their use in creating cordage, thread and twine and threads in their use in creating fabrics.)

37600000 # Fabrics (cloth)

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37700000 # Plastics

37800000 # Rubber (Includes natural and synthetic rubber.)

37900000 # Dyes and pigments

40000000 SOCIAL SCIENCES

41000000 SS BEHAVIORAL SCIENCES

41100000 # History of anthropology*

41200000 # History of psychology*

41300000 # History of sociology*

41400000 # Demography (Includes population characteristics, density, growth.) (For statistical aspects of demographic studies, see Statistics; for methodology of demography see Methodology and research techniques in the behavioral sciences.)

41500000 # Methodology and research techniques in the behavioral sciences (For the applicable knowledge of statistics see Statistics.)

41510000 Research design techniques

41511000 # Continuing study design (Includes longitudinal studies.)

41512000 # Descriptive study designs

41513000 # Experimental study designs (Includes manipulative designs, after only, before-after, post-test control group, pre-test/post-test control group, multiple control group, Solomon Four Group design.)

41514000 # Data collection methods

41515000 # Sampling methods (Includes survey and other sampling methods.)

41520000 Intelligence and ability and their measurement

41521000 # General intelligence and its measurement (Includes Stanford-Binet, Wechsler Scales, group tests, performance and non-language tests.)

41521100 # Adult intelligence and its measurement

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41521200 # Infant and preschool intelligence and their measurement

41522000 # Differential abilities and aptitudes and their measurement (Includes tests of sensory capacities, motor functions, mechanical aptitudes, clerical aptitudes, artistic aptitudes, musical aptitudes, literary appreciation, creativity, reasoning.)

41523000 # Achievement and achievement measurement (Includes tests of General Educational Development, California Achievement Tests, Iowa Tests of Basic Skills, Stanford Achievement Tests, proficiency examinations, performance evaluation, High School Equivalency, Scholastic Aptitude Tests, Graduate Record Examinations, licensure examinations.)

41530000 Personality measurement (See also Personality theory.)

41531000 # Personality inventories (Includes Cattell 16 Personality Factor Inventory, Bell Adjustment Inventory, Minnesota Multiphasic Personality Inventory, Edwards' Personal Preference Schedule.)

41532000 # Projective techniques (Includes TAT, Rorschach, Rosenweig Picture Frustration, play, psychodrama.)

41540000 # Attitude measurement (Includes Likert's Methods of Summated Ratings, Bogardus' Social Distance Scale, Behavioral Differential, Semantic Differential, Thurstone Equal Interval Technique.)

41600000 Behavioral processes of the individual

41610000 Sensation and perception

41611000 Sensation (sensory processes and behavioral manifestations of sense organs) (Includes aspects of sensation such as threshold determination, sensory adaptation, sensory discrimination, sensory deprivation.) (See also Normal structure and function in BIOLOGICAL SCIENCES.)

41611100 # Auditory (Includes masking, pitch, loudness and attributes of tones.)

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41611200 # Visual

41611300 # Cutaneous (touch)

41611400 # Kinesthetic (motion and location of body and body parts)

41611500 # Taste and smell (chemically based senses)

41612000 Perception (the registration of sensory stimuli)

41612100 # Object perception and perceptual constancies

41612200 # Selection, attention and set

41612300 # Perceptual organization (Includes grouping, closure, figure and ground, distance and depth, direction and orientation, movement, form.)

41613000 # Extrasensory perception

41614000 # Subliminal perception

41615000 State of awareness

41615100 # Hypnotically induced states

41615200 # Hypnogogic states

41615300 # Sleeping phenomena

41615400 # Drug induced states of awareness (See also Pharmacology.)

41615500 # Territorial behavior

41616000 Stress theories

41620000 Learning theory (Includes reinforcement patterns and schedules, extinction, spontaneous recovery, reconditioning, generalization and discrimination.)

41621000 # Conditioned response learning (Includes classical and operant conditioning.)

41622000 # Cognitive learning (Includes Gestalt learning and other cognitive learning approaches.)

41623000 # Motivational approaches to learning (Includes drive reduction.)

41624000 # Verbal learning (See also Psycholinguistics.)

41625000 # Perceptual Motor Learning

41626000 # Retention and forgetting (Includes massed and distributive practice, whole-part, overlearning, short-term and long-term memory phenomena.)

41627000 # Transfer of training

41630000 # Thought processes (Includes creative thinking, concept formation, problem solving, adaptive thinking, symbolic thinking.)

41640000 Motivation

41641000 # Automonic drives (Includes hunger, thirst, regulation of temperature, conditions of arousal of, selective and directional behavior of, satiation and gratification of autonomic drives.)

41642000 # Sex drives (Includes conditions of arousal of, selective and directional behavior of, satiation and gratification of sex drives.)

41643000 # Learned bases of motivation (Includes ego-adaptive and social motives such as power, prestige, conditions of arousal of, selective and directional behavior of, satiation of, and gratification of learned bases of motivation.)

41650000 # Emotions (Includes conditions of arousal of emotions, disruptive and adaptive aspects of emotions, mood change.)

41660000 Development and growth of behavioral processes of the individual (See also Normal structure and function, Growth and development in BIOLOGICAL SCIENCES.)

41661000 # Motor development

41662000 # Perceptual development

41663000 # Cognitive development

41664000 # Language development (See also Psycholinguistics.)

41665000 # Emotional (affective) development

41666000 Stages of development of behavioral processes of the individual

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41666100 # Infant behavioral development (Includes mother-child interaction, adaptive behavior.)

41666110 Infant & Child Care

41666200 # Childhood behavioral development

41666300 # Adolescent behavioral development

41666400 # Young adulthood behavioral development

41666500 # Adult behavioral development

41666600 # Old age behavioral development

41666700 # Death and dying behavioral development

41670000 SS # Personality theory (structure and functioning of normal personality) (Includes such personality theories as psychoanalytic, self, field and ego and the ways in which they are synthesized in actual application; determinants of personality.)

41680000 # Attitude theory (Includes attitude formation, structure and change within the individual.)

41690000 Psychopathology (For Neurological disorders see Pathology.)

41691000 # Mental retardation (See also Pathology in BIOLOGICAL SCIENCES.)

41692000 # Organic brain syndromes (See also Pathology in BIOLOGICAL SCIENCES.)

41693000 # Psychoses (Includes schizophrenia, affective disorders, paranoid states.) (Excludes psychoses of organic brain syndromes.)

41694000 # Neuroses

41695000 Personality disorders and other non-psychotic mental disorders

41695100 # Personality disorders (Includes personality disorders such as the obsessive-compulsive, asthenic, passive-aggressive personality.) (Note that this category excludes neuroses and psychoses.)

41695200 # Disorders involving addictive behavior (Includes alcoholism, drug dependence.) (See also Pharmacology.)*

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41696000 # Psychosomatic disorders (psychophysiological disorders)

41697000 # Transient situational distrubances (temporary psychopathological disturbances due to acute situational stress)

41710000 SS Psychotherapy and counseling

41711000 # Individual psychotherapy and counseling*

41712000 # Group psychotherapy and counseling*

41713000 # Occupational therapy (as a psychotherapeutic technique) (For vocational rehabilitation see Rehabilitation medicine.)

41714000 # Recreational therapy (as a psychotherapeutic technique) (For therapeutic recreation involving physical disorders see Rehabilitation medicine.)

41720000 # Organic therapy (Includes chemotherapy, insulin and sub-insulin shock therapy, electroshock therapy.) (See also Pharmacology.) (For surgical treatment see Surgery, Normal structure and function in BIOLOGICAL SCIENCES.)

41800000 Social processes and social structures

41810000 SS Culture (Includes cross-cultural comparisons among primitive and modern societies.) (See also HISTORY.)

41811000 # Technological and material aspects of culture (Includes handicrafts, clothing and adornment, housing, travel and transportation, tools, weapons, machinery.)*

41812000 # Artistic expressions of culture (what any given art form reflects about a particular culture) (See also HUMANITIES AND THE ARTS.)*

41813000 # Scientific achievements (Includes advancements in environmental adaptation, medicine, astronomy.)*

41814000 SS # Belief systems (Includes religious, mythological, cosmological and ethical systems.) (See also RELIGION AND PHILOSOPHY.)*

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41815000 # Economic organization (Includes division of labor, systems of production, exchange and comsumption, property concepts.) See also ECONOMICS.)*

41816000 # Political organizations as an expression of culture (Includes temporary, egalitarian and stratified forms of government.) (See also POLITICAL SCIENCE.)*

41817000 SS # Language as an expression of culture (Includes structural and functional relationship of language to culture.) (See also LINGUISTICS AND LANGUAGES.)*

41818000 # Personality and attitudinal manifestations of culture (Includes concepts of acceptable social role behavior and deviance, attitude towards strangers within and outside of culture.)*

41819000 # Social organization (Includes family structure and kinship groups, marriage, birth, initiation, puberty, courtship patterns, descent and age group systems, sexual and status relations between sexes.)

41820000 SS # Interpersonal (dyadic--two person interaction) processes

41830000 # Social perception (perception by individuals of other people and social phenomena)

41840000 Social groups and processes (Includes group processes.)

41841000 # Small group behavior (structure and dynamics of small groups)

41842000 # Large group behavior (Includes crowds, mobs, mass demonstrations.)

41843000 # Leadership (Includes authoritarian, laissez-faire and democratic styles.)

41843100 Parliamentary Procedure

41844000 # Distribution and use of power

41845000 # Communication patterns in groups (Includes verbal and non-verbal aspects.)

41846000 # Functional roles of group members

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41847000 # Group boundaries

41848000 # Reference group effect on behavior

41849000 # Group decision-making

41851000 # Goal-setting (Includes group norms and standards.)

41852000 # Group cohesiveness

41853000 # Group effectiveness (Includes productivity.)

41860000 Inter-group processes

41861000 # Group differences in social attitudes, principles, beliefs, norms, and behavior

41862000 # Conflict theory (Includes types of conflict, manifestations of conflict, conflict resolution.)

41863000 # Social groups and structures as a basis of stratification

41863100 # Class stratification (socio-economic)

41863200 # Castes (Includes other means of differentiation in traditional societies.)

41863300 # Race, ethnic groupings, and other forms of minority-majority stratification (Excludes class and caste stratification.)

41863310 # Ethnic groups as a basis of stratification

41863320 # Religion as a basis of stratification

41863330 # Sex as a basis of stratification

41863340 # Race as a basis of stratification

41863350 SS # Special problems of stratification in the United States

41863351 # The Negro in the United States

41863352 # The American Indian in the United States

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41863353 # The Mexican-American in the United States

41863354 # Puerto Ricans and other Latin-Americans in the United States

41863355 # Orientals in the United States

41863356 # Jews in the United States

41864000 # Social diffusion (the transmission of cultural traits from one group to another) (Includes the concept of spontaneous invention.)

41865000 # Acculturation, assimilation, and integration (the processes of adjustment of different social groups or societies existing side-by-side)

41870000 Social change

41871000 Cultural and social evolution and revolution

41871100 # Evolutionary social change

41871200 # Revolutionary social change (Includes techniques and strategies.)

41871300 # Technology and social change

41872000 # Social disorganization (affecting individuals and groups) (Includes alienation, suicide, environmental abuse.)

41880000 Institutional structures and social processes

41881000 # Socialization processes (those mechanisms which transmit social values and practices) (Includes ceremonies, customs, rewards, sanctions.) (See also Development and growth of behavioral processes of the individual, and Culture.)

41882000 # Mass communication processes and public opinion (Includes use of media techniques to influence opinions and behavior, propaganda, effects on prejudices, stereotypes.)

41883000 # Community groups, community control, and community organization (techniques and theories.)

41884000 SS Social service administration and policy (See also ECONOMICS and POLITICAL SCIENCE when applicable; see also Psychotherapy and counseling.)

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41884100 # Social services for the poor or indigent administration and policy (Includes welfare.)

41884200 # Health services administration and policy (Includes public health and family health services, hospital-based services.)

41884300 # Educational and training services administration and policy (For Methods of education and training see EDUCATION.)

41884400 # Employment services administration and policy

41884500 # Legal services administration and policy

41884600 # Child care services administration and policy

41884700 # Recreational services administration and policy

41884800 # Special services for the aged or infirm administration and policy

41884900 # Consumer protection services administration and policy (See also ECONOMICS.)

41885100 # Social agencies (public and private) administration and policy

41886000 Organizational theory (analysis and techniques)

41886100 # Formal and informal organization (Includes approaches to organizational analysis such as the structuralist theory.)

41886200 # Organizational co-ordination (Includes "linking pin" work group, cross-departmental committees, matrix organization, service procedure in bureaucracy.)

41886300 # Organizational design (Includes centralization-decentralization, departmentation, line-staff organization.)

41886400 # Organizational change

42000000 EDUCATION

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42100000 # Educational foundations

42110000 # History of education (Includes descriptive educational history, history of educational thought.)*

42120000 # Educational behavioral sciences

42121000 # Educational behavioral processes (For the study of specific behavioral processes such as learning theory, motivation, etc., see also Behavioral processes.)

42122000 # Educational social processes (For the study of specific social processes such as small group behavior see also Social processes and social structures and other appropriate SOCIAL SCIENCES.)

42200000 # Curriculum design (Includes subject curriculum, correlated curriculum, broad fields curriculum, core curriculum, experience or activity curriculum.)

42300000 SS # Systems of content presentation (Includes procedures such as lecture, symposium, panel, forum, role-playing, case study, demonstration, colloquium, audio-visual techniques, programmed instruction, micro-labs and laboratory methods.)

42400000 # Educational administration (See also BEHAVIORAL SCIENCES, Social processes and social structures.)

42500000 Stages of education

42510000 # Preschool education

42520000 # Elementary school education

42530000 # Secondary school education

42540000 # General adult education

42550000 # College level education

42600000 Specialized education

42610000 # Vocational education

42620000 # Technical education

42630000 SS # Professional education

42631000 # Graduate education

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42700000 Special education

42710000 # Education of the blind and visually impaired

42720000 # Education of the deaf and hearing impaired

42730000 # Education of the physically handicapped

42740000 # Education of the mentally retarded

42750000 # Education of the intellectually gifted

42760000 # Education of the emotionally disturbed

42770000 # Education of the neurologically impaired

42780000 # Remedial education for children and adults

42800000 # Education guidance (counselor education)

43000000 ECONOMICS (See also related subjects in the other SOCIAL SCIENCES, MATHEMATICS and STATISTICS.) (For econometrics see appropriate methods in MATHEMATICS and STATISTICS and appropriate subject categories.)

43100000 # Economic history and philosophy (Includes history of economic thought, philosophic questions related to the methodology of economics and history of economic events.)*

43200000 # Micro-economics (theory of the firm and the household) (Includes marginal analysis of product and factor costs and pricing, perfect and imperfect competition.) (For study of actual market analysis and industries see Managerial economics and Industrial organization.)*

43300000 # Macro-economics (theory of the economy as a whole) (Includes the theory of income, employment, price and investment determinations in the economy as a whole, monetary theory and governmental fiscal options of spending and taxation.) (See also Economic growth, development and planning and Labor, manpower and human resources.) (For social accounting see Business and social accounting.)*

43400000 # International economics (Includes theory of trade, common markets and international trade agreements.) (For accounting aspects of balance of payments see Business and social accounting.)*

43500000 # Economic growth, development and planning (Includes both advanced industrial, newly industrial and pre-industrial societies, comparative economic systems.)*

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43600000 # Labor, manpower and human resources (Includes labor economics, industrial relations, labor force analysis, wage and salary administration, job analysis, and manpower development as an economic concept.)*

43700000 # Consumer economics (Includes consumer protection, business practices related to consumer interests, money management for the household.)*

43800000 # Regional and urban economics (Includes economic geography, location theory, regional economic planning, economic problems of urban areas.) (For input-output analysis for regions see Quantitative economics.)*

43900000 # Quantitative economics (Includes quantitative methods identified with the field of economics such as input-output analysis, indifference analysis, geometric analysis, equilibrium analysis.) (For statistical and mathematical techniques used in mathematical economics and econometrics see appropriate categories in Mathematics and Statistics.)*

44100000 Industrial organization (applied economics)

44110000 # Industrial finance*

44120000 # Industrial regulation and control (See also LAW.)

44130000 # Industry studies (Includes study of actual industries, conditions of entry, concentration, product differentiation, size and demand.)

44140000 # Managerial economics (Includes organization of production, decision-making.) (See also Organizational theory in the BEHAVIORAL SCIENCES.)

44141000 # Marketing and forecasting (See also BEHAVIORAL SCIENCES.)*

44142000 # Cost analysis (costs of production, overhead costs, capital costs, financial costs related to output and production) (Includes cost accounting, break-even points, cost aspects of benefit-cost analysis.)*

44143000 # Business and social accounting (Includes profit and loss statements, balance sheets, capital accounts, production accounts for the firm or the economy as a whole; bookkeeping, money flows, accounting aspects of balance of payments.) (For input-output analysis see Quantitative economics.)

1 2 3 4 5 6 7 8

45000000 POLITICAL SCIENCES

45100000 # Political history (Includes the development of cultural and national contexts, theories of city-state, universal community, national states.)

45200000 # Systemic analysis (political systems) (Note that the categories included below each refer to the processes by which individuals act through such institutional and associational interest groups as political parties, legislatures, armies, bureaucracies, trade unions, business organizations, ethnic associations, professional associations, religious organizations, and civic groups. Where applicable these processes also include those expressed through political functionaries, tribunals, courts, mass media and extra-legal or secret groups and societies.) (See also Institutional analysis.)

45210000 # Interest articulation (the process by which individuals make demands upon the political decision makers)

45220000 # Interest aggregation (the conversion of demands into general policy alternatives)

45230000 # Rule-making and legislation (establishment of rules imposing obligations and the limiting of conflicts)

45240000 # Rule-application (the application of laws and statutes to particular circumstances)

45250000 # Rule-adjudication (the making of authoritative decisions on whether a rule has been transgressed in a given case)

45260000 # Communication (the flow of information in political systems) (Note that this process involves informal face-to-face contacts and formal governmental structures)

45270000 # Rule-transformation (Note that this category includes institutional forms as well as revolution, war, rebellion.)

45300000 Institutional political analysis (Note that the categories included refer to the powers, recruitment and situational role of the particular institution.) (See also Systemic analysis.)

45310000 Political organization of individual nations

1 2 3 4 5 6 7 8

45311000 # Institutionalized national government (those institutionalized forms which represent the embodiment of constituted government) (Includes executive, legislative, judicial and law enforcing structures and function.)*

45312000 # Non-institutionalized forms of national government (those political institutions which affect but do not represent constitutional government such as political parties, political movements and lobbies.)*

45320000 Supra-national and international political organization

45321000 # Institutionalized international government (those institutionalized forms which represent the embodiment of internationally constituted government such as the United Nations, World Court, trusteeships, formal military alliances)*

45322000 # Non-institutionalized international government (those political institutions which affect international government but do not represent constituted government, such as international political movements, informal alliances, pacts.)*

50000000 MATHEMATICS AND RELATED DISCIPLINES

51000000 SS MATHEMATICS

51100000 # Foundations of mathematics

51110000 # Mathematical logic (Includes symbolic logic, mathematical reasoning, Boolean algebra.)

51120000 Set theory

51200000 Algebra

51210000 # Group, ring and field theory (Includes the study of algebraic laws governing real and complex numbers.)

51220000 Linear and multilinear algebra

51221000 # Pure linear algebra (Includes matrices, transformations, determinants, eigenvalues, eigenvectors, Jordan canonical form, idempotents, bilinear, quadratic, and hermitian forms, convex sets.)

1 2 3 4 5 6 7 8

51222000 # Pure multilinear algebra

41223000 Applied linear and multilinear algebra

51223400 Mathematical programming (mathematical expression of systems)

51223410 # Graph theory (flow through different lines on graphs) (See also Network flows and Linear programming.)

51223420 # Network flows (Includes Ford-Fulkerson theory, maximum flows and minimal cost flow algorithms.)

51300000 Mathematical analysis

51310000 # Functions of real and complex variables

51311000 # Elementary functions and analytic geometry (Includes ordinary algebraic and transcendental functions and their graphs, polynomials, trigonometric and exponential functions.)

51312000 # Sequence, series, limits

51313000 # Differential and integral calculus

51314000 # Summability (of numbers and functions)

51330000 # Ordinary and partial differential equations (Includes ordinary linear and non-linear differential equations and systems of equations, Sturm-Liouville theory, Poincare-Bendixson theory, elliptic, parabolic, hyperbolic and mixed type theories in the linear case including systems of partial differential equations in the linear and non-linear case.)

52000000 SS PROBABILITY AND STATISTICS

52100000 Probability and stochastic processes

52110000 # Stochastic processes

52120000 # Sampling distribution (Includes univariate, bivariate, multivariate cases.)

52130000 # Combinatorial probability (Note that this category excludes sampling distribution.)

1 2 3 4 5 6 7 8

52140000 # Probability in continua

52150000 Applied probability and stochastic processes

52151000 # Markov processes

52152000 # Queuing (Includes birth and death processes, congestion, mass service and related stochastic systems.)

52153000 # Martingales

52154000 # Mathematical reliability (Includes design, planning, and testing for reliability using appropriate probability distributions.)

52155000 # Mathematical inventory (Includes optimal policies for dynamic inventory, and production planning models with deterministic requirements.)

52156000 # Dynamic programming (probabilistic) (For deterministic dynamic programming see Applied linear and multilinear algebra.)

52157000 # Stationary series estimation (Includes the univariate and multivariate cases.)

52158000 # Correlogram or spectral analysis (Includes the univariate and multivariate cases.)

52159000 # Game theory

52161000 # Statistical decision theory

52200000 Statistics

52210000 # Foundations of statistics

52211000 # Logic of inductive inference

52212000 # Measurement (Includes scaling, dimensional analysis.)

52220000 # Descriptive statistics (Includes standard frequency and distribution functions, measures of location such as mean (average), median, and mode, measures of dispersion such as range and standard deviation, and graphic and tabular representation of data.)

52230000 # Statistical design of experiments

1 2 3 4 5 6 7 8

52240000 # Sampling theory (Includes random sampling, stratified sampling, cluster sampling, purposive sampling.)

52250000 # Statistical theory of relationships

52251000 # Functional relationships (See also Measurement.)

52252000 # Correlation and regression analysis (Includes linear and non-linear, simple and multiple regression analysis; trend-fitting and time-series analysis involving linear regression.)

52253000 # Factor analysis

52254000 # Latent structure analysis

52255000 # Discriminant function analysis

52260000 # Statistical inference

52261000 Estimation

52261100 # Fixed sample size methods of estimation

52261110 Parametric methods of fixed sample size method of estimation

52261120 Non-parametric methods of fixed sample size method of estimation

52261200 # Sequential methods of estimation

52261210 Parametric methods of sequential methods of estimation

52262000 Hypothesis testing

52262100 # Fixed sample size methods in hypothesis testing

52262110 Parametric methods of fixed sample size methods in hypothesis testing

52262120 Non-parametric methods of fixed sample size methods in hypothesis tesing

52262200 # Sequential methods

52262210 Parametric methods of sequential methods in hypothesis testing

52262220 Non-parametric methods of sequential methods in hypothesis testing

1 2 3 4 5 6 7 8

52263000 # Analysis of variance and covariance (Includes linear and non-linear normal models.)

52264000 # Spectral analysis (Includes cross-spectral methods for multiple time series analysis and detection of periodicities and other special effects.)

53000000 CYBERNETICS AND COMPUTER SCIENCES

53100000 Cybernetics

53110000 # Foundations of cybernetics (concepts of control and communication in living organisms, machines, organizations and other systems)

53120000 # General systems theory (Includes levels of complexity of systems, organization of systems, interaction of parts of systems.)

53130000 # Control theory (Refers to "classical" system design theory.) (For "modern" or "state space" system design theory, see the appropriate areas of Mathematical analysis; for the appropriate areas of application, refer to relevant categories in other disciplines, e.g., ENGINEERING AND TECHNOLOGY, SOCIAL SCIENCES.)

53131000 # Open loop systems

53132000 # Feedback ("servo") systems

53133000 # Selp-adaptive and "learning" systems

53140000 # Communication theory (Refers to the cybernetic function of communication and control involved in the transfer of information from one source to another.)

53150000 # Information theory (Refers to the cybernetic function of information theory as a means of communication and control) (Includes message transmission, encoding decoding, information as negative entropy.)*

53200000 Computer sciences (For the mathematics involved in computer sciences see MATHEMATICS, PROBABILITY AND STATISTICS, ENGINEERING AND TECHNOLOGY.)

53210000 # Computer programming

53211000 # Systems programming

1 2 3 4 5 6 7 8

53212000 # Application-oriented programming

53220000 # Computer languages*

60000000 HUMANITIES AND THE ARTS

61000000 PHILOSOPHY (For philosophy of particular fields, see categories listed under appropriate fields e.g. Philosophy of music and Philosophy of literature.)

61100000 Systematic philosophy

61110000 # Logic

61120000 # Ethics

61130000 # Aesthetics

61140000 # Epistemology

61150000 # Metaphysics

61151000 # Cosmology

61152000 # Ontology

61200000 Historical philosophy

61210000 # Western philosophy*

61220000 # Eastern philosophy*

62000000 RELIGION

62100000 # Systematic and doctrinal religion

62200000 # Sacred writings and love

62300000 # Religious worship (Includes liturgy, sacraments and rites, religious music and dance as they relate to worship.)

62400000 # Comparative religion

62500000 # Religious traditions and sects

62510000 # Judaism

62520000 # Christianity

62530000 # Islam

1 2 3 4 5 6 7 8

62540000 # Ancient Near Eastern and Greco-Roman religions

62550000 # Buddhism (Includes Zen, Hinayana, Mahayana, Tantrism.)

62560000 # Hinduism

62570000 # Confucianism-Taoism

62580000 # African religions*

62590000 # Polynesian religions*

62610000 # American Indian religions*

63000000 LITERATURE (For techniques of writing literature, see Writing.)

63100000 # History of literature and of literary criticism*

65000000 THE ARTS (See also Aesthetics.)

65100000 # Environmental design (Includes architecture.)*

65200000 Visual art

65210000 # History of visual art*

65220000 # Art theory (Includes line theory and contour, light and shade, perspective, spatial relationships, texture, proportion, symmetry, two and three dimensional design.)

65230000 # Color

65260000 SS # Photography and cinematography (Includes still and television photography.)*

65600000 Writing

65620000 SS # Mechanics of writing English (Includes traditional (prescriptive) grammar, punctuation, spelling, bibliographic and footnote form.) (For mechanics of writing other languages see Languages; for the study of grammar see Linguistics.)

65630000 # Techniques of writing

65631000 # Figurative language and imagery (Includes figures of speech, metaphor.)

65632000 # Symbolism (Includes allegory.)

1 2 3 4 5 6 7 8

65633000 # Dialogue

65634000 # Characterization

65635000 # Plot structures (Includes pacing, climax and anticlimax.)

65638000 # Variation of language (Includes alliteration, assonance.)

65640000 # Forms of writing

65642000 # Prose (Includes novel, short story, essays, biography, autobiography, non-fiction prose, manuals, reports, business correspondence, journalism, criticism.)

67000000 SS LAW (Except where otherwise stated, the following categories refer to the law of the United States.)

67200000 # Legislation*

67210000 # Regulatory Law (Includes nurse practice acts & rules & regulations)

67300000 Interpersonal law

67320000 # Contracts

67321000 # Sales

67322000 # Commercial law

67330000 # Insurance law (Includes maritime insurance, private medical insurance law.) (For public medical insurance see Administrative procedures, Administrative law; for government regulation of private medical insurance see Administrative law.)

67340000 # Copyrights, patents and trademarks

67350000 # Business organizational relationships (Refers to breach of employment contract, structure of a board of directors.)

67380000 # Labor law (Includes regulation of child and women labor, collective bargaining, labor relations.) (See also Business organizational relationships.)

67390000 # Wills

67410000 Torts (status relationships)

1 2 3 4 5 6 7 8

57411000 # Torts - domestic relations (Includes child custody, marital relationships, divorce.)

67412000 # Torts - agency (whether one person is acting for another and what his duties and responsibilities are)

67413000 # Torts - admiralty (oriented towards protection of those on board ship, the passengers and sailors being treated as wards of the court.)

67420000 # Damages

67421000 # Restitution

67422000 # Equity

67500000 State-individual law

67510000 # Individual constitutional rights law

67511000 # Bill of rights law

67513000 # Administrative procedure (as specified by constitutional law, e.g., what procedures an administrative agency must follow under the constitution such as the necessity for a hearing, etc.) (Includes welfare law, juvenile courts, corrections, social security, workmen's compensation, unemployment insurance, medicare.)

68000000 HISTORY AND RELATED DISCIPLINES (See also PHILOSOPHY.) (For the history of a particular discipline, see under that discipline.)

69000000 LINGUISTICS AND LANGUAGE

69100000 Linguistics

69200000 SS Languages (other than English) (Includes knowledge of oral usage; structure and mechanics of writing the language and traditional grammar, spelling and punctuation.) (For mechanics of writing English see Writing.)

70000000 OTHER DISCIPLINES

71000000 # LIBRARY SCIENCE (Includes selection and acquisition; cataloguing and indexing, reference, and circulation.)*

1 2 3 4 5 6 7 8

72000000 FOOD SERVICE (See also Nutrition and dietetics. Social processes and social structures in the Behavioral Sciences in the SOCIAL SCIENCES; Economics in the SOCIAL SCIENCES; Education in the SOCIAL SCIENCES.)

72100000 # Food characteristics (Includes color, texture, consistancy of individual foods and food groups. For the composition of foods see Nutrition and dietetics in the BIOLOGICAL SCIENCES.)

72700000 # Food and supply storage (Includes inventories. For sanitary considerations for food and drink see Sanitation in the BIOLOGICAL SCIENCES.)

73000000 NURSING

73100000 History of Nursing

73200000 Nursing Standards (Nation)

73300000 Nursing Theory

1 2 3 4 5 6 7 8

SPECIAL SECTION ON CATEGORY CHARACTERISTICS

Certain categories in the Knowledge System have been found to be open to misinterpretation or need elaboration in terms of their use in the System. This section draws the user's attention to several of these. The categories are listed in ascending order of their identification codes. Within the Knowledge System, the letters SS appear to the right of the code numbers of the categories listed here.

1 2 3 4 5 6 7 8

11731000 Normal structure and function (The categories listed below include both anatomy and physiology except where otherwise specified.)
p. 1

This broad level category refers to the physiology and anatomy of the healthy human organism. The category is required for an overview of the nature of the normal interrelationship of systems and processes and for general concepts of "normal" structure and "normal" function. Most of the subdivisions of this category deal with systems of the body and organs. Each of these covers both the anatomy and the physiology of the system or organ named. Two subdivisions refer to anatomy alone (Regional Anatomy, 11731100 and Topographic Anatomy, 11731200). It is used when the aspects of anatomy are required independently from physiology. Two subdivisions are included which refer to solely physiologic processes (Homeostasis of Fluids, 11732300, and Metabolism, 11732400).

11731100 # Regional anatomy (Includes head and neck, thorax and abdomen, pelvis and perineum, lower and upper limbs, and skeleton.)
p. 1

Regional Anatomy covers internal structure and how the parts of the body structurally connect with each other as major sections.

11731200 # Topographic anatomy (relation of external manifestations to internal structure and function, e.g. location of pressure points, surface appearanct of joints, muscles and bones.)

Topographic Anatomy includes the relationship between external manifestations and internal structure. The location of a pulse would involve Topographic Anatomy; so too would the palpation of the abdomen done by the doctor who is examining the liver or other internal organs. An MD uses various topographic signposts to locate the organ he wants. Tasks which draw on Surgery may require both Regional Anatomy and Topographic Anatomy in addition to the particular system involved.

1 2 3 4 5 6 7 8

11731300 # Hematopoietic system (Includes blood, red and white blood cells, platelets, and bone marrow, liver and spleen in their blood forming function.)

The Hematopoietic System refers to those aspects of the body concerned with the formation of blood. They include bone marrow and the spleen, liver and lymph nodes in their blood forming capacities. Although the parentheses explanation for this category mentions red and white blood cells, platelets, etc., the reference is not to the shape, size or structure of these cells, but to their formation and function in the body. For tasks which involve the microscopic observation and analysis of blood or urine specimens, the knowledge required is probably that of Cell Morphology (12110000), the structure of cells, rather than knowledge of the Hematopoietic System.

11731500 # Respiratory system
p. 1

11731600 # Digestive system
p. 1

11731610 # Mouth, pharynx (digestive function), and esophagus (Includes
p. 2 tongue, teeth, and salivary glands.)

The anatomy and physiology of the mouth and throat is found under the Respiratory System in a non-identifiable category (11731510) and under the Digestive System in Mouth, Pharynx and Esophagus. In its first location the respiratory physiology of the mouth and throat is covered, and in the other category digestive physiology is covered. In a task such as the taking of a throat specimen for a culture, one is not concerned with physiology, yet the task does not require use of Regional Anatomy, per se. The solution is to pick up Mouth, Pharymx and Esophagus (11731610) where it is identifiable and scale for the anatomical aspects involved. Thus, since

the full amount of detailed knowledge for the category includes physiology and anatomy, this task would require a narrower aspect than all the detailed knowledge contained in the category.

11731930 # Autonomic nervous system (Includes sympathetic and parasympathetic nerves.)
p. 2

This category covers the anatomy and physiology of the involuntary nervous system, the sympathetic and parasympathetic divisions of the nervous system. These systems innervate the visceral organs, heart, blood vessels, glands and smooth muscles.

11732100 # Immunologic system (Includes immunological mechanisms, humoral and cellular factors.)
p. 3

The Immunologic system includes the anatomy and physiology of the organs involved in the body's defense mechanisms against disease and infection. This includes, for example, the production of substances which destroy bacteria and other invading organisms and organs responding to induced immunization such as through innoculation.

11733000 Pathology (abnormal function and structure) (Includes the etiologic and diagnostic aspects of disease.) (See also First aid for emergency treatment and care and Radiobiology.)
p. 4

This broad level category refers to knowledge of the structural and functional alterations and processes in the human body which are caused by disease or abnormal conditions, or which cause disease or abnormal conditions. The category is required for an overview of the nature of pathology and patholgic origins, processes, course of development and manifestations. It is also required for general prescriptive approaches to treatment, cure and care.

1 2 3 4 5 6 7 8

Where illness is involved, the user might choose a category within Pathology describing the pathology type, such as Burns (11734600) or Neoplasms (11733200) and might then also identify the system of the body affected, choosing one of the categories beginning with the words "Disorders of." Where radiation sickness in involved, the user may also wish to identify Radiobiology (12210000).

Categories listed under Normal Structure and Function rather than those under Pathology are often suggested when it is believed that knowing how something is supposed to be implies knowledge of the abnormal. In such cases users are tempted to omit knowledge of Pathology or its subdivisions. However, the way the subject area of Pathology is defined, it includes the etiologic and diagnostic aspects of disease. Thus, if the performed is expected to use such knowledge at any level, the appropriate categories in Pathology must be identified, either at the broad level of Pathology or under the subdivisions representing specific disorders or pathologies.

11734500 # Perinatal morbidity and mortality (shortly before or after birth)
p. 5

This category refers to the life endangering pathologies which occur in the period shortly before and after birth. The period is generally considered to begin with the completion of 28 weeks of gestation and is variously defined as ending one to four weeks after birth.

11734800 # Shock and trauma
p. 5

This category can be a source of some confusion. The word "trauma" is intended to mean a physical wound or injury and excludes psychic trauma

which is the type of emotional shock that makes a lasting impression on the mind, particularly the subconscious mind. The word "shock" refers to a physical state rather than an emotional reaction. It is characterized as a condition of acute peripheral circulatory failure due to derangement of circulatory control, or loss of circulatory fluid brought about by injury. The category is applicable in tasks in which the danger of shock and/or trauma are present as well as in treatment of shock and/or trauma. Shock and trauma are not always associated, and one can be present without the other.

The phenomenon of insulin shock, which is brought about by an overdose of insulin, is caused by a too-sudden reduction of blood sugar. It is associated with diabetes. Insulin shock should be coded under Endocrine, Nutritional and Metabolic Disorders (11733300) and not under Shock and Trauma.

11735000 Surgery
p. 5

Whenever a category covers procedures, its higher scale levels involve knowing the appropriate situations for applications of the procedures, the contraindictions, and the results, as well as the techniques themselves. This applies to this broad category and its subdivisions.

11735400 # Introductory procedures (Includes injections, transfusion, irrigation, catheterization, intubation, tracheotomy.)
p. 6

This cateogry covers a range of activities, some of which are in scale relationship. Irrigations include enemas at a low level on the scale as well as higher-level procedures such as the irrigation of indwelling catheters. Tracheotomy is also included and is still higher on the scale. It involves the clearing of an airway and the introduction of a tube to keep

it open. The insertion of endotracheal and nasogastric tubes require this category, as does intubation in saline abortion. All types of injections are also covered by this category.

11735700 # Manipulation (Includes application of plaster, splint or traction, dilation or stretching.)

11737100 # Bandages, dressings, tourniquets and splints
p. 6

11737400 # Sprains, strains, fractures and their healing
p. 6

11737700 # Wounds and their healing (Includes operative incisions.)
p. 7

Where wounds and their care are involved, a variety of categories may be needed. Manipulation covers knowledge of the techniques, materials and applications of casts, splints, traction, dilation and stretching. It covers the choice of the appropriate techniques (some for surgical purposes) as well as their application.

Bandages, Dressings, Tourniquets and Splints covers knowledge of the available types and their respective uses; Wounds and Their Healing and Sprains, Strains, Fractures and Their Healing cover the condition of the type of injury and the healing processes involved, depending on type.

11738000 # Asepsis (concepts and techniques involved in achievement of sterile condition) (Includes concurrent and terminal disinfection during surgery, aspects of sterilization of implements and equipment such as autoclaving.)
p. 7

11739430 Sanitation (establishment and maintenance of environmental conditions which are favorable to health) (Includes methods of waste disposal, sanitary considerations for food and drink, insect and rodent control.) (For clinical sterilization techniques see Asepsis.)
p. 7

Asepsis and Sanitation are different knowledge categories and

should be distinguished. Asepsis refers to the knowledge of concepts and techniques involving the achievement of sterile clinical conditions free from pathogenic materials, and is involved in such things as sterilizing examination equipment, giving injections and catheterizing a patient, as well as in surgery.

Sanitation involves the establishment and maintenance of environmental conditions which are favorable to health. While it would normally be related to tasks involving public policy such as rat control and garbage collection, it can be needed in tasks such as teaching a TB patient how to care for a wound under unclean environmental conditions.

11742100 Physical therapy (Excludes speech therapy and hearing therapy.) (See also Mental retardation in the BEHAVIORAL SCIENCES and Special education in EDUCATION.)
p. 8

11742131 # Corrective, preventive and compensatory adjustments (Includes supportive and self-help devices and their use, such as wheel chairs, trusses, crutches and other mechanical devices and special measures to restore functioning, prevent malfunction (e.g. after surgery), and to make use of partial functions.)
p. 8

11742133 # Special post-disease and chronic disease therapy (special corrective procedures for the after-effects of disease such as heart disease, rheumatic fever, epilepsy, blindness, diabetes, pulmonary tuberculosis.)
p. 9

Physical Therapy is a broad category which includes many subdivisions which are required by job titles other than that of the Physical Therapist. The categories under Treatment Modalities (11742140), for example, can be required for tasks associated with many titles in patient care.

Corrective, Preventive and Compensatory Adjustments (11742132) covers colostomy bags and indwelling catheters, as well as wheel chairs and artificial limbs. Special Post-Disease and Chronic Disease Therapy

(11742133) is needed for home visits to the chronically ill, those just released from hospitalization, or for any other special care. It may be needed in many health education tasks or in prescriptive tasks.

12300000 Pharmacology (the study of drugs, i.e. chemical compounds or noninfectious biological substances which may be administered as an aid in the diagnosis, treatment or prevention of disease, for the relief of pain or suffering, or to control or improve any physiological or pathological condition) (See also Normal structure and function, Pathology, Cell biology and CHEMISTRY.)
p. 13

This broad category would be identified only if the task requires something in the way of knowledge in several of its subdivisions or if knowledge of the field per se were needed (that is, if the study of uses, functions and applications of drugs and pharmaceuticals were needed). It would be unusual in the administering of medications for a task to require categories under Molecular Mechanisms of Drug Action (12310000); they might be needed for prescriptive tasks. A high scale level for Pharmacology is more likely to be found in tasks occurring in the pharmacy, chemist's lab and in experimental work; rarely would it be needed at a high level in prescriptive tasks except for the physician who specialized in the use of drugs or in drug effects.

12331000 # Drug toxicity (Includes antidotal therapy.)
p. 14

This category covers the adverse effects of drugs due to the nature of the drug including implications for diet therapy.

12332000 # Drug idiosyncrasy and allergy pharmacogenetics (Includes increased sensitivity to drugs, decreased responsiveness to drugs, novel drug effects, etc., which are due to inherited physical characteristics.)
p. 14

This category covers the adverse effects of drugs due to inherited

characteristics of specific individuals, and/or idiosyncratic reactions to drugs and not the toxic nature of the drug.

12335000 # Drug synergism (presence of two or more drugs in the body having
p. 14 interaction effects and the change in drug action this causes.)

This category covers the interaction produced by the presence of two or more drugs in the system and not the effects of the drugs when taken independently, including implications in diet therapy.

12337000 # Chemical mutagenesis (drugs which induce mutation, a discontin-
p. 14 uous inheritable change in the quality of the offspring, used to inhibit growth of malignant tissues by destroying or modifying the genes)

This category would rarely be required for the usual tasks in patient care, even at the physician's level, unless this specialty area is specifically involved in the elements of the task.

12342600 # Drugs for allergy, cough, vomiting and the dermatomucosal sur-
p. 16 faces (Includes anti-immune drugs, antitussives, antiemetics, dermatomucosal agents.)

This category covers the use of drugs to deal with conditions such as allergy, cough, etc., and is found under Drug Classes (12340000); it does not refer to adverse effects of drugs such as allergy, cough, vomiting, etc.

13100000 Physical chemistry
p. 16

This broad category covers a combined discipline which partakes of the knowledge in Chemistry (13000000) and in Physics (15000000), but which, in combination, amounts to more than the sum of the parts drawn from in the two fields. The categories listed under Physical Chemistry are only

those which it was felt could not be listed either under Chemistry or under Physics. However, since the allocation of subdivided categories is rather arbitrary, the reader should make a special effort to investigate categories under Physics and Chemistry as well.

14111000 # Solutions (mechanical, optical, colligative properties; dilute, p. 24 normal, molar, saturated and supersaturated solutions, whether liquid, solid or gaseous phase) (For analytical tests relying upon one or more of these properties see Chemical analysis and preparation of samples.)

This category may be needed at a low scale level when the task requires knowledge about contrast agents for use in X-ray or fluoroscopy. It will not generally be needed in patient care tasks.

14120000 Chemical analysis and preparation of samples (See also Empirical p. 24 bonding and structure theories and MATERIALS.)

This category is not intended to cover simple tests such as litmus, dipstick or reagent tablet tests. It refers to the type of analytic procedures which are done in a laboratory; it probably will not be required for primary patient care tasks.

14121000 # Mechanical analysis (tests of mechanical properties of matter) p. 24 (Includes gravimetrics, weight and specific gravity, strength, hardness, brittleness, ductility; microscopic analysis of physical properties.)

This category may be needed at a low level for testing the specific gravity of urine samples.

14128000 # Separation methods in analysis (Includes selective absorption, p. 25 distillation and evaporation, extraction by solvents, separation by ion exchange, chromatography and diffusion analysis, precipitation methods.)

This category may be needed at a low level in the preparation of

slides for examination under the microscope. It should be identified only if the task requires the performer to apply knowledge such as the staining properties of dyes or stains. Tasks involving set procedures, such as a routine dipstick or tablet test for the presence of sugar in the urine, do not require any knowledge of this category.

20000000 ENGINEERING AND TECHNOLOGY (See also PHYSICS, CHEMISTRY and
p. 31 MATHEMATICS AND RELATED DISCIPLINES.)

Categories under this major division are <u>applications</u> of knowledge in the Natural Sciences (10000000) and in Mathematics and Related Disciplines (50000000). However, the knowledge categories listed under Engineering and Technology are only those which are sufficiently distinctive to warrant individual identification. Knoweldge categories under the Natural Sciences and/or Mathematics and Related Disciplines may also be required in addition to categories listed under Engineering and Technology.

36000000 MATERIALS (Includes those aspects of materials related to their
p. 33 application in productive processes.)

This major category is listed under Engineering and Technology. Its subdivisions refer to the characteristics and properties of materials in terms of how they are worked with (or on) in production processes. For example, the properties of Wood are relevant to some of the tasks of the carpenter, the furniture designer, the lumberman, the house painter and the naval architect. These categories should not be overlooked. However, knowledge of items made of different materials that are grouped by <u>use</u>, such as <u>suture materials</u>, are really aspects of other categories, for example, Suture (11735600), rather than of Materials, since the uses of otherwise

unrelated materials are involved, rather than the properties of specific materials.

41000000 BEHAVIORAL SCIENCES
p. 33

The fields of Psychology, Sociology and Anthropology overlap in subject matter and methodology to such a great extent that they are not separately categorized (apart from their histories). These three fields are reflected in Behavioral Sciences according to the subject matter covered. The varying approaches taken in these fields are further reflected in the varieties of "slice" represented in the subdivisions of the various categories.

41670000 # Personality theory (structure and functioning of normal personp. 37 ality) (Includes such personality theories as psychoanalytic, self, field and ego and the ways in which they are synthesized in actual application; determinants of personality.)

This category refers to a knowledge of the various theories that have been offered to explain presonality, and would probably not be involved in the type of pragmatic counseling tasks engaged in by nursing personnel.

41710000 Psychotherapy and counseling
p. 38

This broad category and/or any of its subdivisions can be used only when the task requires some knowledge of these fields as such. Beyond this, the Human Interaction skill scale may more likely be what is needed.

41810000 Culture (Includes cross-cultural comparisons among primitive
p. 39 and modern societies.) (See also HISTORY.)

41814000 # Belief systems (Includes religious, mythological, cosmological
p. 39 and ethical systems.) (See also RELIGION and PHILOSOPHY.)

1 2 3 4 5 6 7 8

41817000 # Language as an expression of culture (Includes structural and functional relationship of language to culture.) (See also LINGUISTICS AND LANGUAGES.)
p. 39

41820000 # Interpersonal (dyadic--two person interaction) processes
p. 40

41863350 # Special problems of stratification in the United States
p. 41

These categories may appear to be appropraite for performers who deal with individuals in minority communities. These categories, however, are meant to cover a very different type of knowledge than the kind the performer usually needs in health services tasks. The categories refer to the theories, research and content of such subjects rather than the experiences which they organize as data. When a performer adapts his choice of language and vocabulary to more effectively reach a minority group patient, or is sensitive to problems of discrimination, he is probably using Human Interaction skills which he learns from experience with the people in the community, rather than these categories.

41884000 Social service administration and policy (See also ECONOMICS and POLITICAL SCIENCE when applicable; see also Psychotherapy and counseling.)
p. 42

This broad category and any or all of its subdivisions may be needed when a task requires the performer to give advice or draw on knowledge about available social services. The category involves the policy and administrative aspects of the services, but also covers knowledge of the availabilities of the services. The specific institution's procedures and means for making referrals are aspects of orientation knowledge and do not warrant scaling, but knowledge of the types of services and the philosophies of their administration is transferable and therefore scalable

1 2 3 4 5 6 7 8

knowledge.

42300000 # Systems of content presentation (Includes procedures such as
p. 43 lecture, symposium, panel, forum, role-playing, case study, demonstration, colloquium, audio-visual techniques, programmed instruction, micro-labs and laboratory methods.)

42630000 # Professional and graduate education
p. 44

These two categories may be involved in in-house teaching tasks. They should not be used unless the task requires knowledge of the content covered by these fields as specific disciplines.

51000000 MATHEMATICS
p. 48

52000000 PROBABILITY AND STATISTICS
p. 49

Knowledge in these two major disciplines can be required in tasks which also require categories listed under the Natural Sciences (10000000), the Social Sciences (40000000) and Engineering and Technology (20000000). The user should not assume that subject categories found in the Natural and Social Sciences and in Engineering and Technology automatically include the knowledge of categories in Mathematics or Probability and Statistics that may be involved in the tasks unless so stated. However, categories within Mathematics or Probability and Statistics should be identified only when tasks require more than a rote application of formulas or calculations. Arithmetic is treated under Symbolic Skills and is not identified per se as a knowledge category.

65260000 # Photography and cinematography (Includes still and television
p. 53 photography.)

1 2 3 4 5 6 7 8

This is a category under the Arts (65000000). It refers to the use of these media for artistic purposes and should not be used as a requirement for the image-producing aspects of X-ray and flouroscopy tasks.

65620000 # Mechanics of writing English (Includes traditional (prescriptive) grammar, punctuation, spelling, bibliographic and footnote form.) (For mechanics of writing other languages see Langugage; for the study of grammar see Linguistics.)
p. 54

English is not identified as a language in the Knowledge Systems except that Mechanics of Writing English can be identified. Since English is the language of the society, it would appear for every task and would distort the statistical data. In societies where another language is the dominant language, it would be substituted for English in the Mechancis of Writing English, and would not be otherwise identified.

Not every task that involves recording or writing something down on paper requires this category at a non-zero level on the scale. The task must require standards involving knowledge of prescriptive grammar, punctuation, arrangements into paragraphs, etc. Dictation as well as writing by hand or typing would be covered, provided that the requirements scale above zero. Writing or dictating the report of a surgical operation would warrant a scale value of 5.5. The recording of an examination and recommendations on a patient's chart would require a lesser scale value and, if proper English presentation were needed, might scale at 3.5. Scale points 2.5 and 1.5 are usable for tasks which require enough knowledge of Mechanics of Writing English for the information which is recorded to be understandable to the reader through proper presentation.

67000000 LAW (Except where otherwise stated, the following categories refer to the law of the United States.)
pg. 54

The categories found under this broad level discipline should not

be identified to cover knowledge of the spcific legal regulations which may apply to tasks which require that the performer be licensed before they can be carrier out. Any task or job which is limited by regulations requires that the performer know what the law says in regard to his practice, but this kind of knowledge is probably not transferable as knowledge of the categories listed under Law. For example, an anesthetist must know at what stage in a patient's post-operative recovery his legal responsibility for the life of the patient is terminated, but such knowledge cannot be considered to be a building block to higher levels of legal knowledge. The task would have to require legal knowledge of greater applicability or greater breadth of detail to be scalable above zero or the Knowledge Scale.

69100000 Linguistics
p. 55

Mechanics of Writing English (65620000) is identified for tasks involving writing unless the formal subject matter is itself required. Linguistics is identified only when the task requires that the performer know the content of this discipline, as such, in the performance of a task.

69200000 Languages (other than English) (Includes knowledge of oral usage; structure and mechanics of writing the language and traditional grammar, spelling and punctuation.) (For mechanics of writing English see Writing.)
p. 55

If a task requires any language other than English as an intrinsic part of the task, and not due to the particular circumstances of an institution's location, the task must be coded for the required langauge(s). The category is used for either oral or written use of the language and refers to the structure and mechanics of writing, as well as traditional grammar, spelling, and punctuation.

APPENDIX F

Standard Forms:

Task Description Sheet

Task Description Validation Sheet

Scaling/Annotation Sheet

Skill Scaling Table

Task No.: _____

Analyst No.: _____

Date: _____

TASK DESCRIPTION SHEET
(DATA SUBMISSION FORM)

TASK NO.	ELEMENT NO.	TEXT OF ELEMENT

TASK DESCRIPTION
VALIDATION SHEET

Task No.: _____

Date: _____

(1) What is the output of this task? (Be sure it is broad enough to be repeatable.)

(2) What is used in performing this task? (Note if only certain items must be used. If there is choice, include everything or the kinds of things chosen among.)

(3) Check if there is someone else involved in performing task.

_____ a. recipient (What kind? _____)

_____ b. respondent (What kind? _____)

_____ c. co-worker (What kind? _____)

(4) Name the task so that the answers to 1-3 above are reflected. Underline essential words.

_____

_____

_____

_____

_____

_____

SCALING/ANNOTATION SHEET
(DATA SUBMISSION FORM)

Task Number	Skill and Knowledge Category Number	Category Name	Scale Value	Element Number
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _
_ _ _	_ _ _ _ _ _ _ _ _	_____	_._	_ _._ _

SKILL SCALING TABLE

SCALE NAMES	SCALE VALUES																
	0	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
1. FREQUENCY	0	1		2		3		4				6		7		8		9
2. LOCOMOTION	0		1.5							5				7				9
3. OBJECT MANIPULATION	0		1.5				3.5			5					7.5			9
4. GUIDING OR STEERING	0		1.5			3					5.5			7				9
5. HUMAN INTERACTION	0	1				3				5				7				9
6. LEADERSHIP	0	1				3			4.5				6.5				8.5	
7. LANGUAGE: ORAL USE	0			2				4							7.5			9
8. LANGUAGE: READING USE	0			2						5				7				9
9. LANGUAGE: WRITTEN USE	0			2						5			6.5					9
10. DECISION: METHODS	0		1.5			3			4.5					7				9
11. DECISION: QUALITY	0		1.5	2			3.5				5.5			7				9
12. FIGURAL	0	1					3.5			5				7				9
13. SYMBOLIC	0		1.5				3.5			5				7				9
14. TAXONOMIC	0			2							5.5			7				9
15. IMPLICATIVE	0	1		2				4		5						8		9
16. ERROR: FINANCIAL	0	1						4				6			7.5			9
17. ERROR: HUMAN	0	1		2		3					5.5			7		8		9

APPENDIX G

Glossary of Terms Used
In Task Descriptions

GLOSSARY OF TERMS

Nursing Delination Study
November, 1981

Act: (1) to behave; to do something; to serve or function; (2) to serve as spokesman or substitute (for)

Administer: (1) to manage or direct; (2) to give out or dispense; to give or apply

Advocate: (1) a person who pleads another's cause; a person who speaks or writes in support of something; (2) to speak or write in support of; be in favor of

Analyze: (1) to separate (a thing, idea, etc.) into its parts so as to find out their nature, proportion, function, interrelationship, etc.; (2) to examine in detail so as to determine the nature or tendencies of

Apply: (1) to put on or spread on; place so as to be touching (to apply salve to the skin); (2) to put to some practical or specific use (to apply one's knowledge to a problem)

Appoint: (1) to set (a date, place, etc.); decide upon officially; (2) to name or select officially for an office, position, etc.

Appropriate: right for the purpose; suitable, fit; proper

Assess: to estimate or determine the significance, importance, or value of; evaluate

Change: (1) to put or take (a thing) in place of something else; substitute for, replace with, or transfer to another of a similar kind; (2) to give and receive reciprocally; (3) to cause to become different; to undergo a variation of

Collaborate: to work together, esp. in some literary, artistic or scientific undertaking

Communicate: (1) to pass along, impart, transmit; (2) to make known; (3) to give or exchange information, signals or messages in any way as by talk, gestures, writing; (4) to have a sympathetic or meaningful relationship

Conduct: (1) to show the way to; lead; guide; (2) to manage, control or direct

Consider: (1) to look at carefully; examine; (2) to think about in order to understand or decide; ponder; (3) to keep in mind; take into account; to be thoughtful of; (4) to regard as; (5) to believe or conclude after thought; (6) to think carefully or seriously; reflect

Construct: to build, form, or devise by fitting parts or elements together systematically

Consult: (1) to talk things over in order to decide or plan something; confer; (2) to seek an opinion from; ask the advice of; (3) to refer to or turn to; (4) to keep in mind while acting or deciding; consider

Contract: (1) to enter upon or undertake; (2) to get, acquire, or incur; agree formally

Control: (1) to regulate; (2) to exercise authority over; direct; command; (3) to hold back; restrain

Coordinate: (1) to place in the same order, rank, etc.; (2) to bring into proper order or relation; adjust so as to have harmonious action

Counsel: (1) to give advice to; advise; (2) to urge the acceptance of; recommend; (3) to give or take advice

Define: (1) to determine or set down the boundaries of; (2) to determine or state the extent and nature of; describe exactly; (3) to give the distinquishing characteristics of; (4) to constitute the distinction of; differentiate; (5) to prepare definitions

Delegate: (1) to send or appoint as a representative or deputy; (2) to entrust (authority, power, etc.) to a person acting as one's agent or representative

Delete: to take out (a printed or written letter, word, etc.); cross out

Delimit: to fix the limits of; mark the boundaries of

Delineate: (1) to trace the outline of; sketch out; to draw; depict; (2) to depict in words; describe

Deliver: (1) to give forth, or express, in words; (2) to give or hand over; (3) to carry to and leave at the proper place or places; distribute

Demonstrate: (1) to show by reasoning; (2) to explain or make clear by using examples, experiments, etc.; (3) to show the operation or working of; (4) to show (feelings) plainly

Describe: to tell or write about; give a detailed account of

Design: (1) to plan and carry out; (2) to form (plans, etc.) in the mind; contrive; (3) to plan to do; purpose; intend; (4) to intend or set apart for some purpose

Develop: (1) to cause to grow gradually in some way; cause to become gradually fuller, larger, better, etc.; (2) to make stronger or more effective; to bring (something latent or hypothetical) into activity or reality

Diagnose: to perform the act or process of deciding the nature of a diseased condition by examination of the symptoms

Direct: (1) to manage the affairs, course, or action of; guide, conduct, regulate; (2) to order or command with authority; (3) to turn or point (a person or thing) toward an object or goal; aim

Document: (1) to provide with a document or documents; (2) to provide (a book, pamphlet, etc.) with references as proof or support of things said (document (n.): anything printed, written, etc., relied upon to record or prove something)

Eliminate: (1) to take out; remove; get rid of; (2) to leave out of consideration; reject; omit

Empathize: (1) to feel the projection of one's own personality into the personality of another in order to understand him better; (2) to feel the ability to share in another's emotions or feelings

Establish: (1) to make stable; make firm; settle; (2) to set up (a government, business, etc.) permanently; (3) to cause to be or happen; bring about; (4) to set up (a precedent, theory, etc.) permanently

Evaluate: (1) to find the value or amount of; (2) to judge or determine the worth or quality of; appraise

Examine: (1) to look at or into critically or methodically in order to find out the facts, condition, etc., of; investigate; inspect; scrutinize; inquire into; (2) to test by carefully questioning in order to find out the knowledge, skill, qualifications, etc., of (a student, witness, job applicant, etc.)

Explain: (1) to make clear, plain, or understandable; (2) to give the meaning or interpretation of; expound; (3) to account for; state reasons for

Follow: (1) to come or go after; (2) to come or go after in time, in a series, etc.; (3) to take as a model; act in accordance with; imitate; to accept the authority of; obey; (4) to support or advocate the ideas, opinions, etc. of; (5) to watch or listen to closely; observe; (6) to be interested in or attentive to current developments in; (7) to understand the continuity or logic of

Guide: (1) to point out the way for; direct on a course; conduct; lead; (2) to give instruction to; train; (3) to direct (the policies, actions, etc.) of; manage; regulate

Identify: (1) to make identical; consider or treat as the same (to identify one's interests with another's); (2) to recognize as being or show to be the very same person or thing known, described or claimed; fix the identity of (to identify a biological specimen); sympathize (with)

Implement: (1) to carry into effect; fulfill; accomplish; (2) to provide the means for the carrying out of; give practical effect to

Influence: to exert or have influence on; have an effect on the nature, behavior, development, action or thought of

Interact: to act on one another; act reciprocally

Intervene: to come between as an influencing force, as in order to modify, settle or hinder some action, argument, etc.

Interview: (1) to have a meeting of people face to face, as for evaluating or questioning a job applicant; (2) to have a meeting in which a person is asked about his views, activities, etc.

Investigate: to search into so as to learn the facts; inquire into systematically

Lead: (1) to show the way to, or direct the course of, by going before or along with; conduct, guide; (2) to guide or direct, as by persuasion or influence, to a course of action or thought; prompt; (3) to be the head of

Listen: (1) to make a conscious effort to hear; attend closely so as to hear; (2) to give heed; take advice

Maintain: (1) to keep or keep up; continue in or with; carry on; (2) to keep in existence or continuance; (3) to keep in a certain condition or position, esp. of efficiency, good repair, etc.; preserve

Manage: (1) to control the movement or behavior of, (2) to have charge of; direct; conduct; administer

Measure: (1) to find out or estimate the extent, dimentions, etc., of; esp. by a standard; (2) to estimate by comparison; judge; appraise

Monitor: (1) to watch or check on (a person or thing) as a monitor; (2) to check on or regulate the performance of (a machine, etc.); (3) to listen in on

Motivate: to provide with, or affect as, some inner drive, impulse, intention, etc., that causes a person to do something or act in a certain way; incite or impel

Negotiate: (1) to confer, bargain, or discuss with a view to reaching agreement; (2) to make arrangements, for, settle, or conclude (a business transaction, treaty, etc.)

Nurture: (1) to feed or nourish; (2) to raise or promote the development of; train, educate, rear, foster, etc.

Observe: (1) to adhere to, follow, keep, or abide by; (2) to notice or perceive (something) (3) to pay special attention to; (4) to examine and study scientifically; (5) to comment or remark (on or upon)

Organize: (1) to arrange in an orderly way; (2) to make into a whole with unified and coherent relationships; (3) to make plans or arrange for; (4) to bring into being; establish; institute

Orient: (1) to adjust with relation to facts or principles; correct; (2) to adjust or adapt to a particular situation (often used reflexively)

Participate: to have or take a part or share with others (in some activity, enterprise, etc.)

Plan: (1) to devise a scheme for doing, making, or arranging; (2) to have in mind as a project or purpose (refers to any detailed method, formulated beforehand, for doing or making something)

Predict: to state (what one believes will happen); foretell (a future event or events)

Set Priority: to set precedence in time, order, importance, etc.

Protect: to shield from injury, danger, or loss; guard; defend

Question: to ask a question or questions of; interrogate; put queries to

Recommend: (1) to suggest favorably as suited for some use, function, position, etc.; (2) to advise, counsel, suggest

Recruit: to enlist (new members) for a party, organization, etc.to hire or engage the services of

Refer: (1) to assign or attribute (to) as cause or origin; (2) to send or direct (to someone or something) for aid information, etc.; (3) to relate or apply (to); (4) to direct attention; or make reference or allusion (to)

Relate: (1) to tell the story of; narrate; recount; (2) to connect or associate, as in thought or meaning; show a relacion between

Review: (1) to view, or look at, again; (2) to look back on; view in retrospect; (3) to examine or inspect; (4) to give or write a critical report and evaluation of

Schedule: (1) to place or include in a list, catalog, or inventory of details; (2) to plan for a certain time

Select: to choose or pick out from among others, as for excellence, desirability, etc.; choose

Speak: to express or communicate opinions, feelings, ideas, etc., by or ask by talking; converse

Suggest: (1) to mention as something to think over, act on, etc,; bring to mind for consideration; (2) to bring or call to mind through association of ideas; (3) to propose as a possibility; (4) to show indirectly; imply; intimate

Supervise: to oversee, direct, or manage (work, workers, a project, etc.)

Support: (1) to give courage, faith or confidence to; (2) to give approval to or be in favor of; subscribe to; uphold; (3) to maintain or provide for (a person, institution, etc.) with money or subsistence

Synthesize: (1) to bring together into a whole by the putting together of parts or elements; (2) to form by bringing together separate parts

Teach: (1) to show or help to learn how to do something; give instruction to; (2) to give lessons to; guide the study of; instruct; (3) to provide with knowledge insight, etc.; cause to know, understand, etc.

Treat: (1) to subject to some process or to some substance in processing; (2) to give medical or sugical care to (someone) for some disorder

Unit: ??

Use: (1) to put or bring into action or service; employ for or apply to a given purpose; (2) to practice, exercise; (to use one's judgement)

Visit: (1) to go or come to see in a professional or business capacity; (2) to go or come to (a place) in order to inspect or investigate

Write: (1) to form or inscribe (words, letters, symbols); put down in a form to be read (to write a paragraph); (2) to communicate with in writing